comnet
Communication Networks

INSTALLATION AND OPERATION MANUAL

netwave®

INDUSTRIAL OUTDOOR 802.11A/B/G/N DUAL RADIO WIRELESS ETHERNET

This manual serves the following ComNet Model Numbers:

NW8
NW8E

Thank you for purchasing NetWave® from ComNet. This installation guide applies to the following models:

NW8: Industrial Multipoint, FCC Version, User Configurable
NW8E: Industrial Multipoint, ETSI Version, User Configurable

The NetWave® industrially hardened wireless dual radio Ethernet transmission device is designed to be used with an external antenna and is used for redundant ring and drop & repeat topologies. Both radios can be configured through the embedded User Interface as a Client or as an Access Point. Radio 2 supports 5GHz operation and is connected to the 19dBi internal antenna. Radio 1 is user selectable for 5GHz or 2.4GHz and connects to an external antenna. The NW8 and NW8E support up to 145Mbps throughput using MIMO technology. The units can be powered by an IEEE 802.3af/at PoE compliant device or through a supplied power injection module with the second Ethernet port operational as an IEEE802.3at PoE power source. The NW8 is FCC certified for use in North America and the NW8E is ETSI, DFS and TPC certified for use in the European Union.

About This Guide

This guide is intended for different users such as engineers, integrators, developers, IT managers, and technicians.

It assumes that users have some PC competence and are familiar with Microsoft Windows operating systems and web browsers such as Windows Internet Explorer and Mozilla Firefox, as well as have knowledge of the following:

» Installation of electronic equipment
» Electrical regulations and guidelines
» Knowledge of Local Area Network technology

Related Documentation

The following documentation is also available:

» NW8/NW8E Datasheets
» NW8/NW8E Quick Start Guides

Website

For information on ComNet's entire product line, please visit the ComNet website at **http://www.comnet.net**

Support

For any questions or technical assistance, please contact your sales person (**sales@comnet.net**) or the customer service support center (**techsupport@comnet.net**)

Safety

» Only ComNet service personnel can service the equipment. Please contact ComNet Technical Support.
» The equipment should be installed in locations with controlled access, or other means of security, and controlled by persons of authority.

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Overview

Legal Information

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1.0 Introduction

The NetWave® industrially hardened wireless dual radio Ethernet transmission device is designed to be used with an external antenna and is used for **redundant ring and drop & repeat topologies**. Both radios can be configured through the embedded User Interface as a Client or as an Access Point. Radio 2 supports 5GHz operation and is connected to the 19dBi internal antenna. Radio 1 is user selectable for 5GHz or 2.4GHz and connects to an external antenna. The NW8 and NW8E support up to 145Mbps throughput using MIMO technology. The units can be powered by an IEEE 802.3af/at PoE compliant device or through a supplied power injection module with the second Ethernet port operational as an IEEE 802.3at PoE power source. The NW8 is FCC certified for use in North America and the NW8E is ETSI, DFS and TPC certified for use in the European Union. This manual contains detailed information covering ComNet NetWave outdoor NW8 and NW8E wireless products. NetWave was designed for use in a wide ambient operating temperature range. NetWave provides a cost effective 802.11-based solution. The units are user configurable for either point to point or point to multipoint applications.

This manual contains detailed operational and configuration information not covered in the quick start guides.

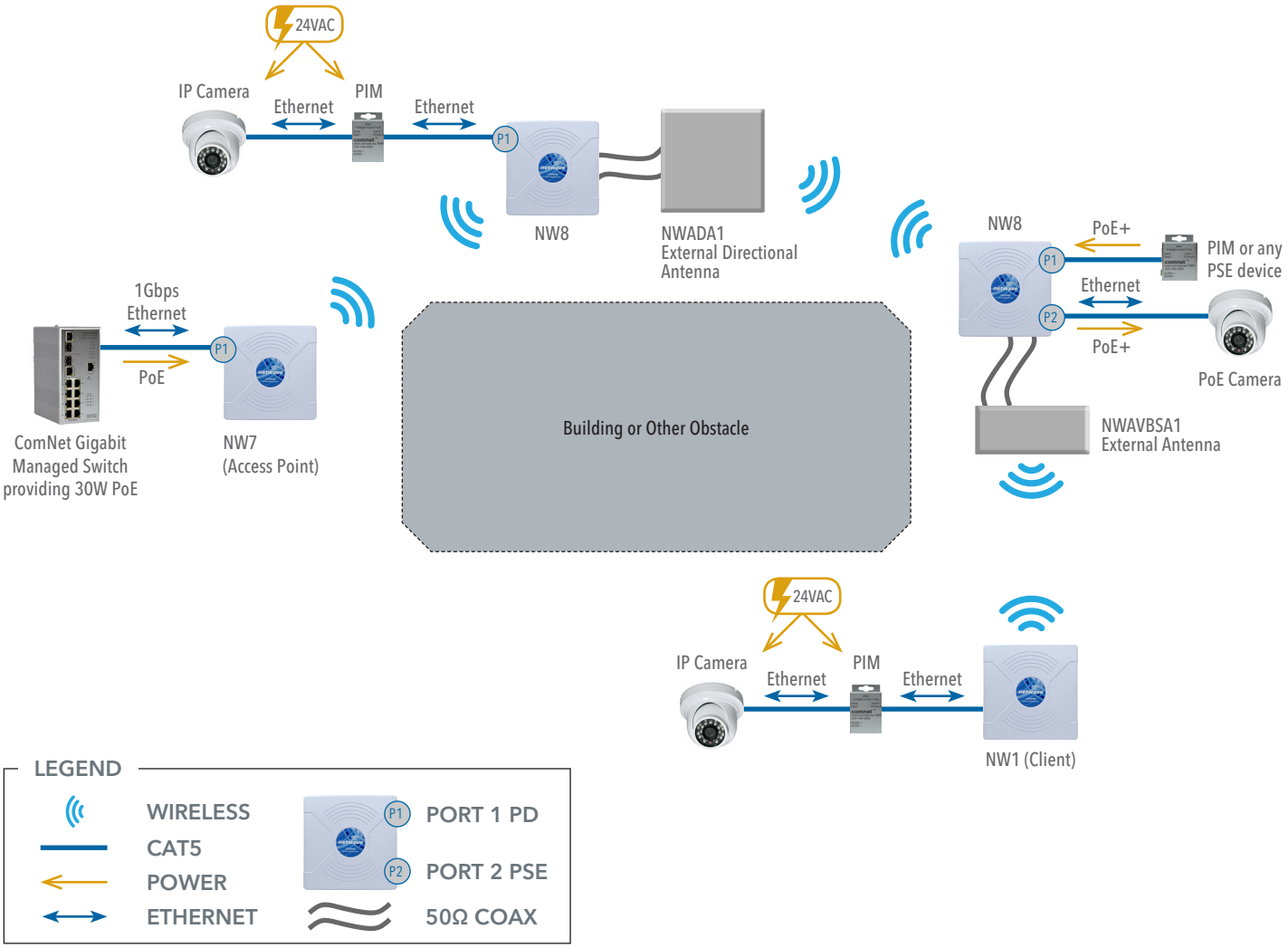
This guide applies to the following models:

NW8 – Industrial Hardened Dual Radio, Two Gb Ethernet Ports, One internal 19dBi 17° beamwidth directional antenna, includes power injection module, power supply and mounting hardware, Port 1 supports IEEE 802.3af/at PD PoE, Port 2 provides IEEE 802.3at PSE PoE Power, FCC Certified for use in the NA region.

NW8E – Industrial Hardened Dual Radio, Two Gb Ethernet Ports, One internal 19dBi 17° beamwidth directional antenna, includes power injection module, power supply and mounting hardware, Port 1 supports IEEE 802.3af/at PD PoE, Port 2 provides IEEE 802.3at PSE PoE Power, ETSI Certified for use in the EU region

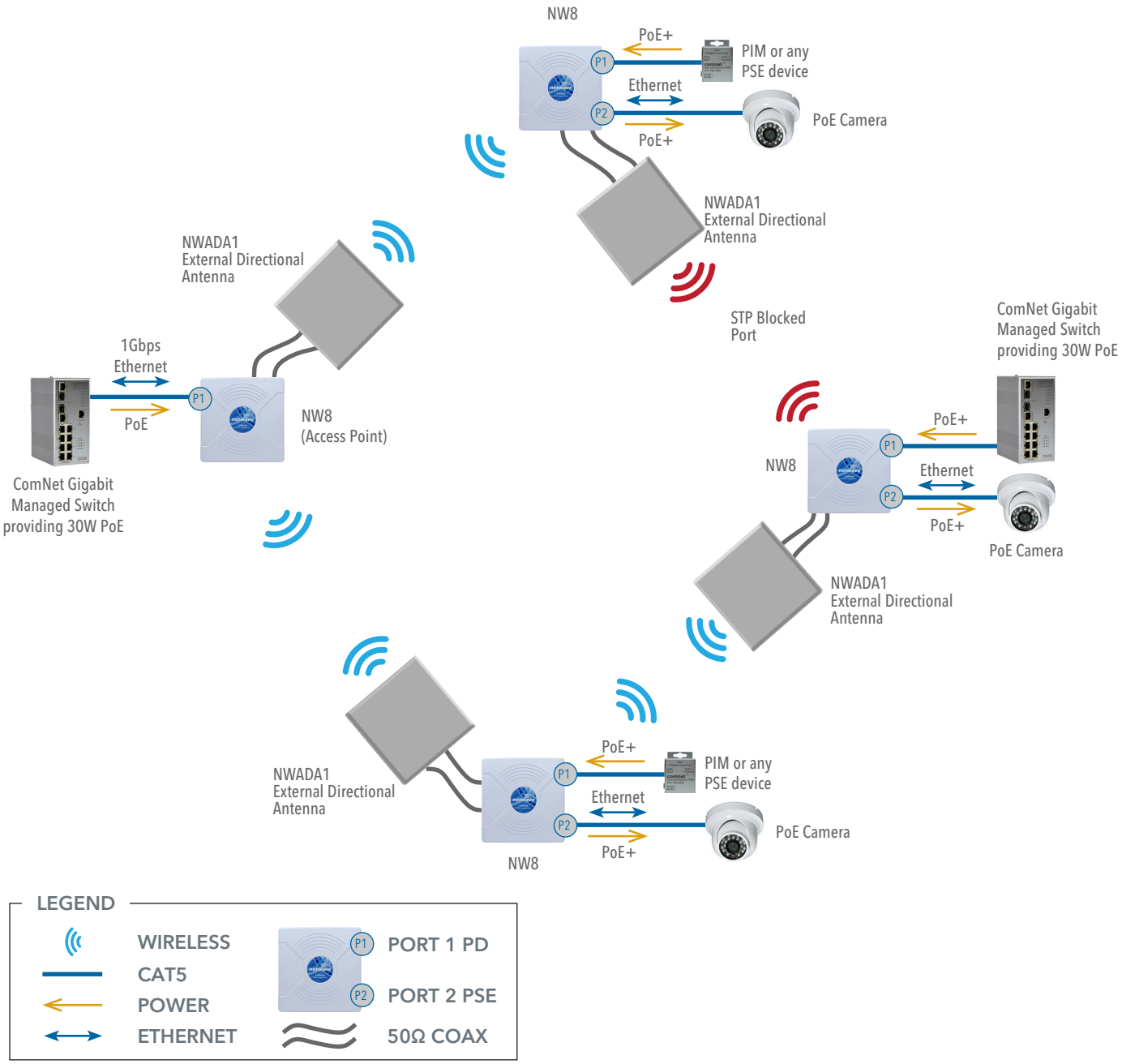
2.0 Drop and Repeat – NW8 and NW8E

The Dual Radio Netwave product with external antenna can be used in a Drop and Repeat topology with any other Netwave Access Point. This design is recommended in situations where there is an object blocking Line of Sight. There is a MAC address lock feature for the FCC version that can be enabled for either radio through the user interface but is not enabled by default. The NW8 and NW8E has an integrated 19dBi directional antenna and supports external antenna connection to Radio 1. See the ComNet website for the latest information regarding antenna options and support.



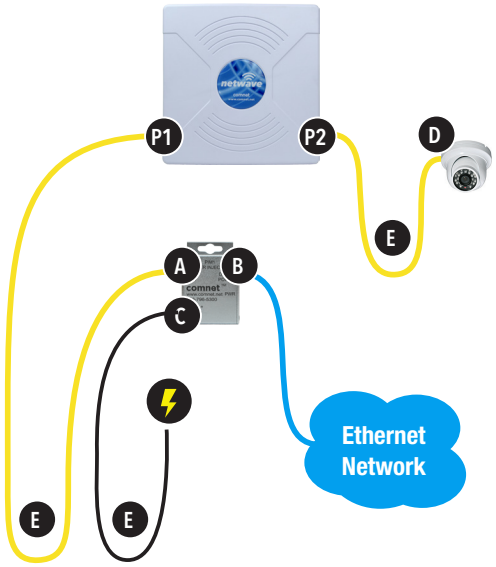
3.0 Redundant Ring – NW8 and NW8E

A redundant ring topology is a unidirectional transmission link between devices that forms a closed loop. In this setup, Spanning Tree must be enabled (off by default) to prevent a loop in the network.



4.0 PoE Pass-through Port – NW8 and NW8E

The Netwave NW8 and NW8E come with dual Gigabit Ethernet ports. Port 1 supports IEEE 802.3af/at PD PoE power and Port 2 is a Power over Ethernet IEEE 802.3at PSE (Power Sourcing Equipment) port that acts as a voltage source and supplies PoE PD devices with power via the Ethernet cable.



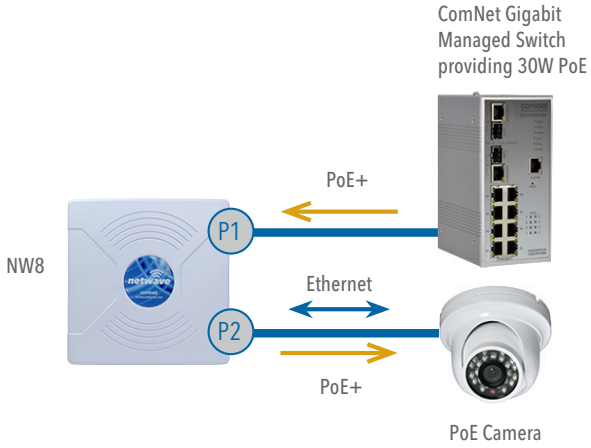
A. OUT port of the Power Injection Module (PIM)

B. IN port of the PIM

C. Power socket of the PIM.

D. External PoE device, typically a camera as shown

E. Drip Loop (recommended)



5.0 Cabling Requirements

Shielded CAT 5 or better should be used for all out of plant Ethernet connection and should be properly grounded through the PoE AC ground. Industrial grade shielded Ethernet cable is recommended to help prevent ESD damage commonly experienced with outdoor installations. Visit www.comnet.net/comnet-products/cables

The NW8 and NW8E have two N Female external connectors for connecting an antenna.

6.0 Hardware Installation

6.1 NW8 and NW8E Outdoor Ethernet Gland Installation

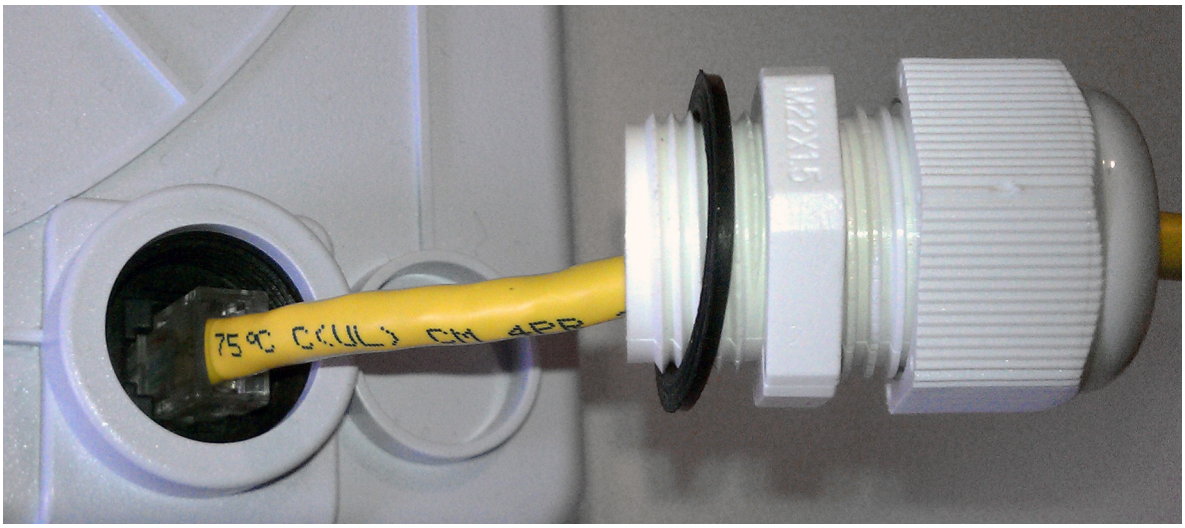
There will be two cable glands and a weather seal cap included with each outdoor enclosure. The provided weather seal cap should be used when Port 2 is not in use to prevent damage to the port and the wireless device.

Below is an image of the individual parts of the gland with an Ethernet cable routed through.

Note: The split rubber washer allows a pre-terminated Ethernet cable to be used.

Once the cable has been routed through the weather connection as shown, push the split rubber gasket into place and loosely screw the cap that goes over the rubber washer.

Below is an image with the Ethernet connection made to the node and the gland assembly about to be installed.



Once the RJ45 connection has been made, screw in the gland into the housing making sure it is tight enough for a water tight seal but not so tight to cause the rubber seal to squeeze off.

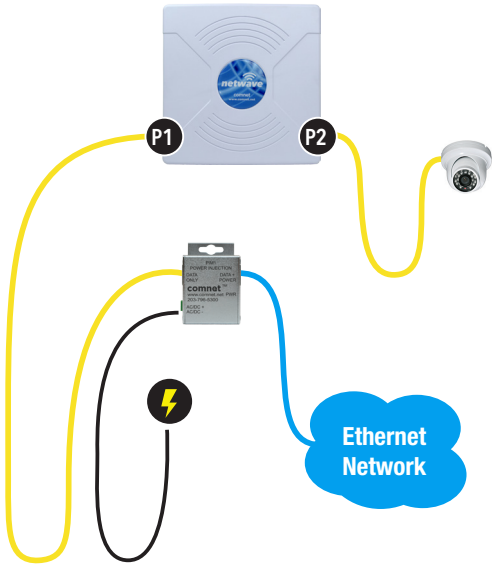
Once the gland is tight in the housing, tighten the outer nut/cap making sure the rubber seal squeezes and seals the Ethernet cable to the gland as shown below.

Connect one end of an RJ-45 Ethernet cable to the LAN OUT port of the Power Injection Module (PIM) and the other end to LAN of the access point – as sown below.

Note: Maximum length of the RJ-45 CAT5 cable is 100 meters without powering a second device connected to port 2.

Connect the RJ-45 Ethernet cable attached to the PIM to a network device, such as a switch or to the configuration PC. Then plug the power adaptor to an AC power outlet and power plug into the socket of the PIM – as shown in the diagram below.

Note: DC Passive PoE input of 48 VDC. If powering a second device from Port 2, it is recommended not to exceed 20 meters from the PIM/PoE+ PSE to the Access Point and not to exceed 5 meters from the AP to the Camera or secondary device.

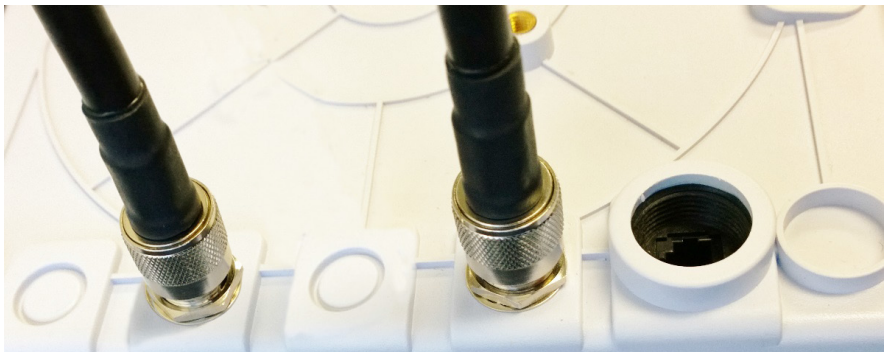


When mounting the hardware outdoors, it is highly recommended to create a drip loop with the Ethernet cable to prevent moisture from getting into the gland.

6.2 NW8 and NW8E Antenna Installation

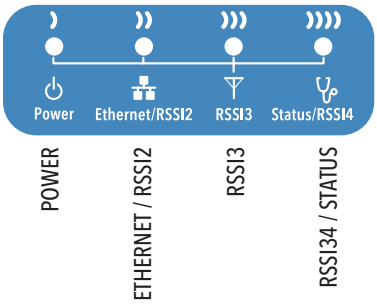
To connect an external antenna to the NW8 and NW8E, attach RF Cables (not included) to the N Female connectors on the device.

RF Cables need to be properly fastened to have a secure connection. Press down firmly on the N Male connector of the antenna cable and tighten.



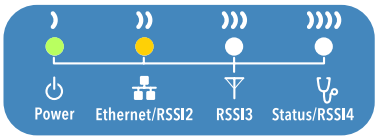
6.3 NW8 and NW8E Indicating LED Details

Note: External RSSI LEDs are for Radio 1 only. One needs to logon to the embedded configuration pages to view the RSSI levels of Radio 2



LED	VISUAL CUE	INDICATION
POWER	SOLID GREEN	Power is supplied to the NW8/NW8E
	OFF	No power is supplied to the NW8/NW8E
ETHERNET / RSSI2	FLASH GREEN	Ethernet connection is established
	SOLID YELLOW	Ethernet connection is established and there is activity present RSSI Level is > Yellow LED Threshold
	OFF	No Ethernet connection established. RSSI Level is < Yellow LED Threshold
RSSI3	SOLID GREEN	Good signal strength
RSSI4 / STATUS	FLASH GREEN	Unit is booting up
	SOLID GREEN	Excellent signal strength (Advisable to check Status Page to confirm RSSI is <70)

SIGNAL STRENGTH:



MINIMUM SIGNAL

MAXIMUM SIGNAL

Power – will illuminate when there is power applied to the Ethernet port

Ethernet – will illuminate when there is an active Ethernet connection

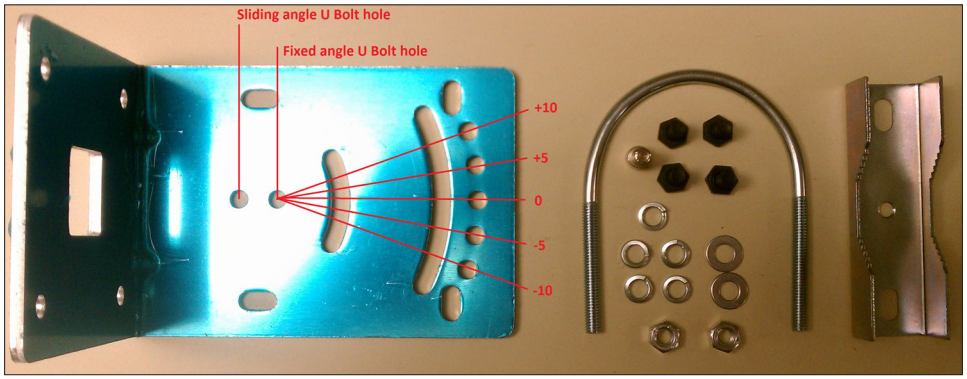
RSSI3 – will illuminate when the RSSI threshold goes above what is set in the RSSI LED Setting section of the WIRELESS SETTINGS page

Status/RSSI4 – Provided status during boot and will illuminate solid when the RSSI threshold goes above what is set in the RSSI LED Setting section of the WIRELESS SETTINGS page

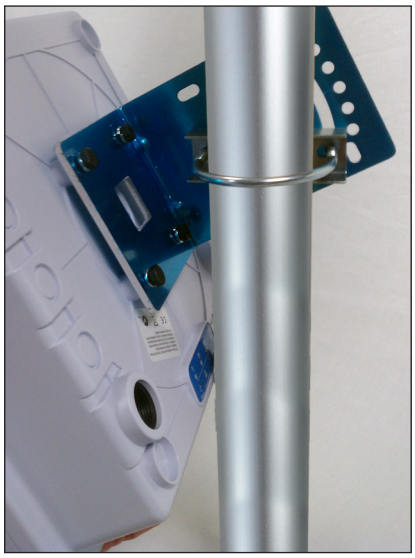
6.4 NW8 and NW8E Outdoor Standard Mounting Hardware

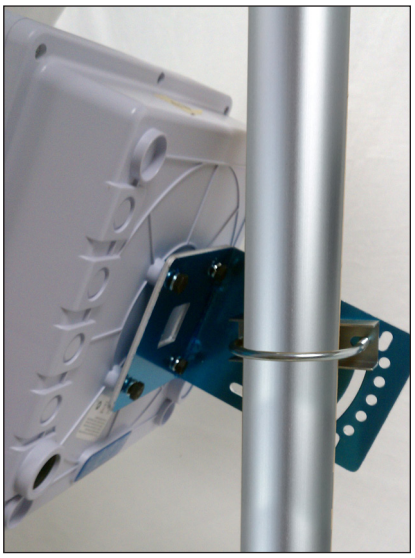
This mounting hardware will support pole diameters up to 3 in (7.6 cm).

Below are the parts contained in the standard mounting hardware



Here is the mounting hardware assembled shown in a +45° and -45°vertical position

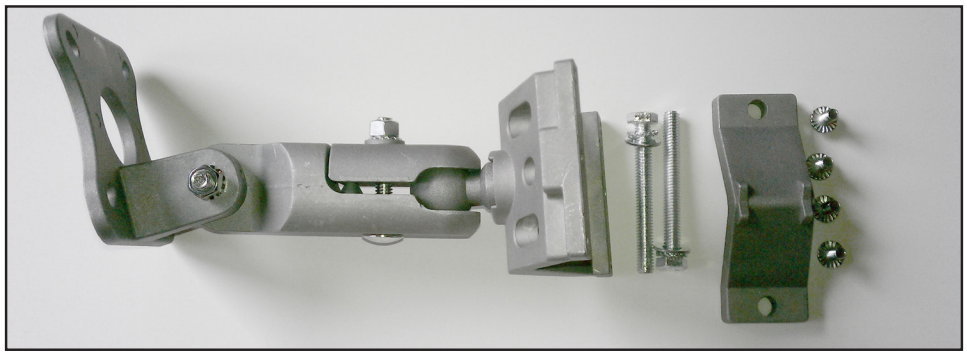




6.5 NW8 and NW8E Outdoor Upgrade Mounting Hardware

An upgrade to the outdoor mounting hardware is available. This optional version is of heavier construction supporting an articulating joint and is designed for wall or pole mount supporting up to a 3 inch or 76mm pole.

Note: This hardware is sold separately under part number NWBKT1



6.6 Optional Outdoor Industrial Rated Shielded CAT6 Cable

The CAT6 upgrade is an outdoor and industrial rated CAT6 cable with Anti-Crosstalk divider, drain wire, foil shield and shielded connector with drain wire tab. Connector lock is also available.

7.0 Key Default Configurations

IP Address of Web Server	192.168.10.102
LAN Mode for Web Server	Static Addressing
Web Server User ID	admin
Web Server Password	admin
Web Server Guest User ID	guest
Web Server Guest Password	guest
SSID	NetWave-1
WPA Pre-shared Key	12345678
Channel-Frequency (AP)	Auto
Channel Spectrum Width	20/40M
Long Range Parameters	Enabled and defaulted to 1000m
STP	Disabled

Note: A Reset to defaults (performed on the ADMIN page) will erase all user configurations.

8.0 Quick Configuration

1. Connect an Ethernet cable from the port labelled as IN on the power Injection Module to either a laptop or a PC LAN port.
2. Connect the second Ethernet cable from the OUT port on the Power Injection Module to the NetWave port 1.
3. Apply 48VDC to the Power Injection Module with the provided power supply. You should notice the green LED illuminate in the Power Injection Module and the power LED on the NetWave unit.
4. Set the IP address of the laptop being used to configure NetWave to static and the subnet to 192.168.10.x/24 subnet.
5. Point the browser to 192.168.10.102. This is the default address.
6. A login prompt will pop up. Enter:
   ID admin
   Password admin
7. Select the NETWORK SETTINGS tab and set the desired network settings.
   Select Apply Settings
   Select Save

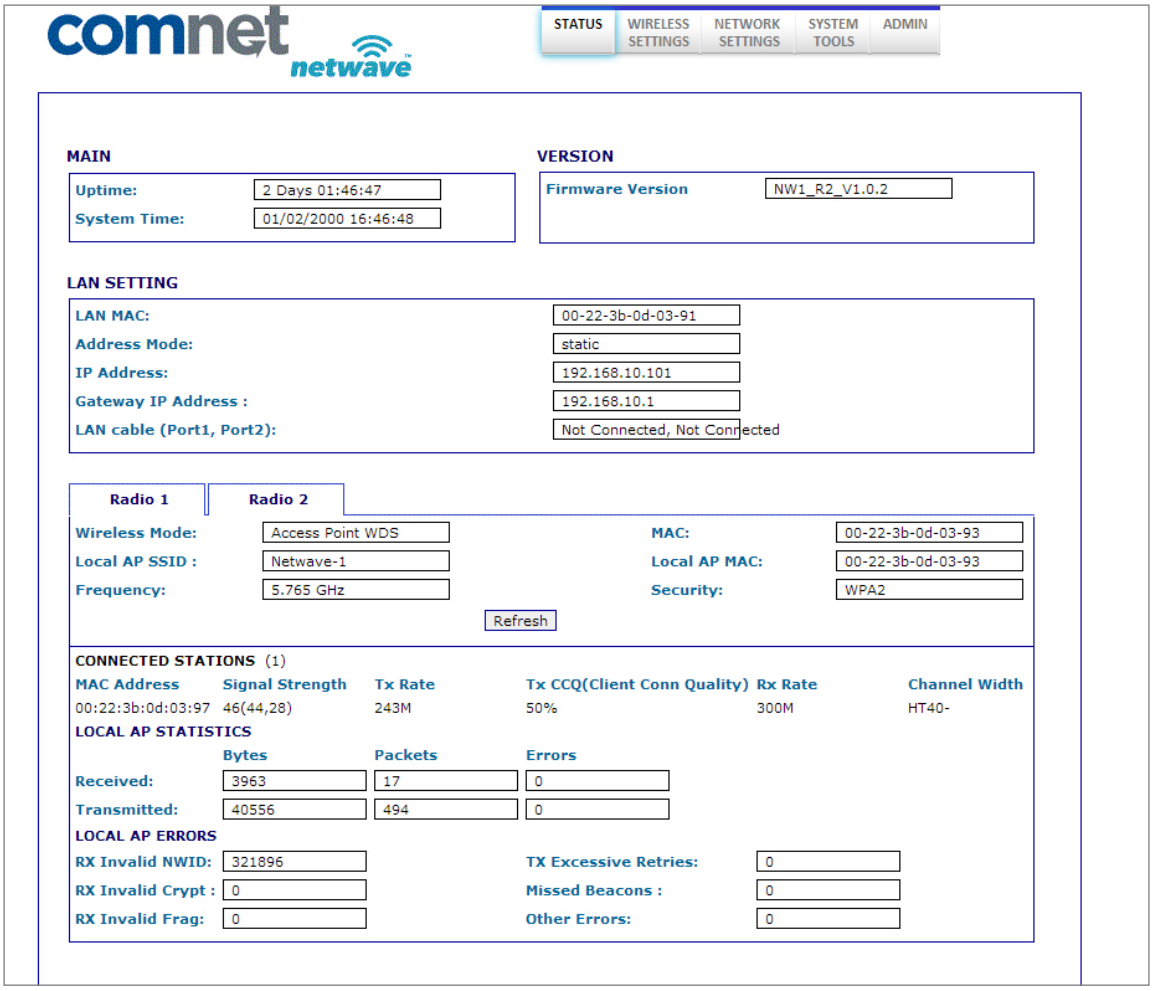
Note: This will be the network address for the NetWave web server. It is not necessary to set to the same subnet as the operating network but it is recommended.

8. Select the WIRELESS SETTINGS tab and set:
   • Wireless mode – Set to AP or Client
   • Country code – Only required if setting up the NW8E (ETSI) model
   Note: It is the user's responsibility to ensure that the correct country is chosen. ComNet accepts no liability for incorrect equipment set up.
   • Output RF power – if RSSI is greater than 70, it is recommended to reduce RF TX power at the remote/ connected node.
   • Set SSID – if changing from the default setting
   • Channel Spectrum Width – May want to reduce to 20M or even 10M from the default 20/40M if the 5GHz spectrum is crowded or experiencing unstable connections across the link.
   • Wireless Security – if changing from default settings
   • Select Apply Settings
   • Select Save

Note: : NW8 and NW8E nodes may need to have the Wireless Mode set to either AP or Client (default is Client for Radio 1 and Access Point for Radio 2). The unit IP addresses will need to be all set to different addresses (default address is 192.168.10.102). This is the IP address of the embedded configuration web server. Therefore, it is recommended that configuration be performed one at a time and prior to deployment.

9.0 Detailed Configuration

9.1 STATUS Page – Access Point



9.1.1 STATUS_AP Page MAIN Section

This section will list the unit uptime as well as the system time which can be set on the SYSTEM TOOLS page.

9.1.2 STATUS_AP Page LAN SETTING Section

LAN MAC	Lists the MAC address for the electrical copper Ethernet port
Address Mode	Shows the current setting for setting the IP address for the embedded web server. This is configured on the NETWORK SETTINGS page
IP Address	Current IP address for the embedded web server
Gateway IP Address	IP address for the network gateway
LAN Port Connections	Shows connection status for copper Ethernet ports 1 and 2.

9.1.3 STATUS_AP Page RADIO 1 Section

Wireless Mode	Shows the operational mode for the radio. This can be set on the WIRELESS SETTINGS page.
Local AP SSID	SSID that this AP is broadcasting.
Frequency	Frequency that the AP is operating on
MAC	MAC address of the AP radio
Local AP MAC	MAC address of the AP radio
Security	Operating security. This can be selected on the WIRELESS SETTINGS page

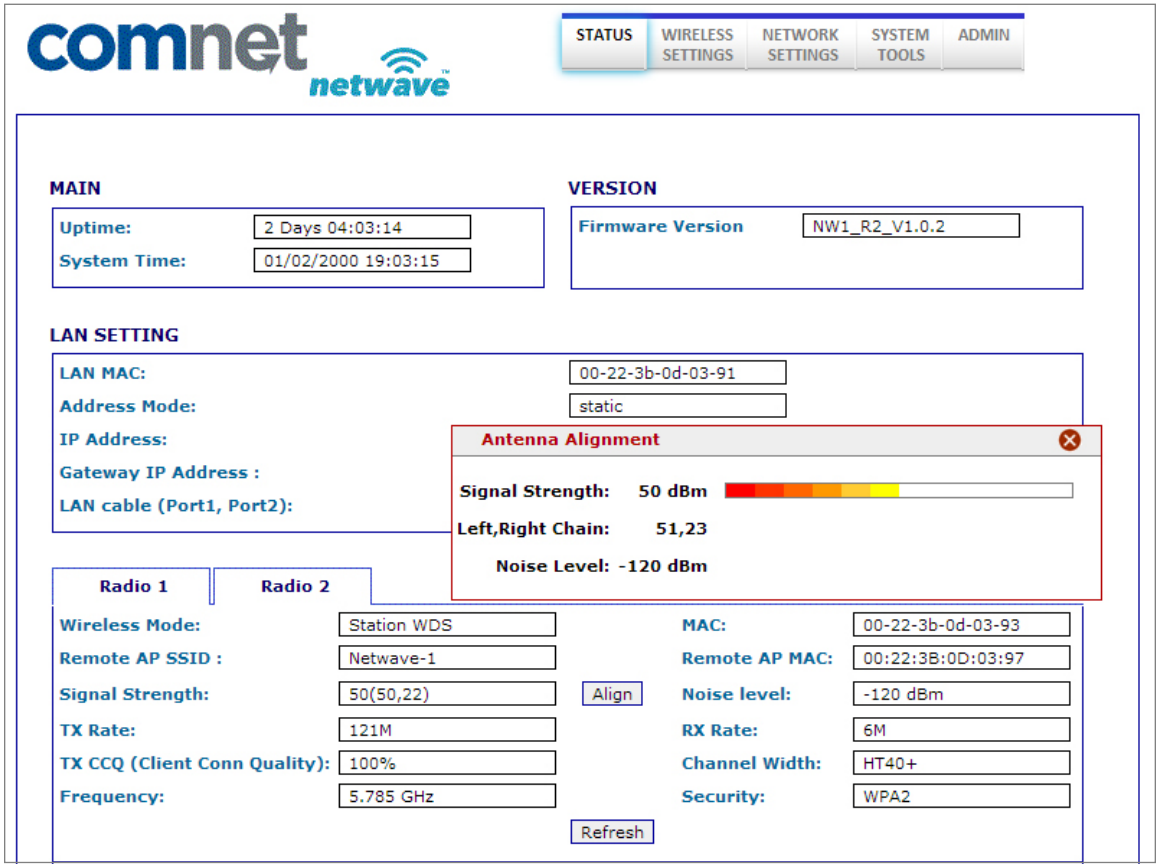
9.1.4 STATUS_AP Page CONNECTED STATIONS Section

MAC Address	Lists the MAC addresses of the connected stations
Signal Strength	Lists the RSSI values of the connected stations
Tx Rate	will show the transmit radio connection rate
TX CCQ	Client Connection Quality. Given in % and provide the radio connection quality with the connected AP with 100% being the best.
Channel Width	channel width the radio connection is using. This is automatically determined based on the radio connection quality when 20/40M channel bandwidth is selected on the WIRELESS SETTINGS page. Possible connections that may be displayed are listed below starting with the best/fastest connection HT40+ HT40 HT40- HT20 HT10
Refresh Button	This will cause the data that feeds this page to be refreshed.

9.1.5 STATUS_AP Page LOCAL AP ERRORS Section

RX Invalid NWID	Shows the number of SSIDs detected that is different from the Remote AP SSID. This number will continually count up and will count up faster in congested RF environments. It is normal to see this count increase.
RX Invalid Crypt	Represents the number of transmitted and received packets which were encrypted with the wrong encryption key and failed the decryption routines. It can be used to detect invalid wireless security settings and encryption break attempts.
RX Invalid Frags	This value represents dropped packets due to packet reassembly failure due to link layer fragments.
TX Excessive Retries	Represents the number of packet delivery failures. Undelivered packets are retransmitted a set number of times before an error is logged and counted.
Missed Beacons	Beacons are management packets sent by an AP and this value represents the number of beacons which were not received by the client. Missed Beacon counts could indicate that there is too much distance between the Client and AP.
Other Errors	This count represents the total number of transmitted and received packets that were lost or discarded for reasons other than what is listed above.

9.2 STATUS- Radio 2 - Client



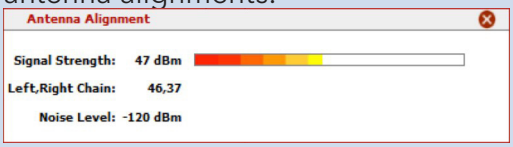
9.2.1 STATUS-Client Page MAIN Section

This section will list the unit uptime as well as the system time which can be set on the SYSTEM TOOLS page.

9.2.2 STATUS-Client Page LAN SETTING Section

LAN MAC	Lists the MAC address for the electrical copper Ethernet port
Address Mode	Shows the current setting for setting the IP address for the embedded web server. This is configured on the NETWORK SETTINGS page
IP Address	Current IP address for the embedded web server
Gateway IP Address	IP address for the network gateway
LAN Port Connections	Shows connection status for copper Ethernet ports 1 and 2.

9.2.3 STATUS-Client Page RADIO Section

Wireless Mode	Lists the operational mode for the radio. This can be set on the WIRELESS SETTINGS page.
Remote AP SSID	SSID for that the client will scan and connect to.
Noise Level	Receiver noise floor. A higher number indicates an operating environment with more RF noise/congestion.
Signal Strength	Received signal strength.
TX Rate	Radio connect rate for the transmit portion
RX Rate	Radio connect rate for the receive portion
TX CCQ	Client Connection Quality. Given in % and provide the radio connection quality with the connected AP with 100% being the best.
Frequency	Frequency the client is using to connect to the AP
MAC	MAC address of the client radio
Remote AP MAC	MAC address of the connected AP radio
Channel Width	channel width the radio connection is using. This is automatically determined based on the radio connection quality when 20/40M channel bandwidth is selected on the WIRELESS SETTINGS page. Possible connections that may be displayed are listed below starting with the best/fastest connection HT40+ HT40 HT40- HT20 HT10
Security	Operating security. This can be selected on the WIRELESS SETTINGS page
Align Button	This will produce a pop up Antenna Alignment window (shown below) that will render a graphical RSSI meter. This meter will present a scale between 0 and 100. This tool may be helpful when performing antenna alignments.  ***NOTE: RSSI values above 70 will begin to cause reduction of link throughput. RSSI values greater than 75 will significantly reduce link throughput but RSSI values this high are normally experienced during bench testing.***
Refresh Button	This will cause the data that feeds this page to be refreshed.

9.2.4 STATUS-Client Page LOCAL STATION STATICS Section

Received	Shows Bytes, Packets, and Errors received
Transmitted	Shows Bytes, Packets, and Errors transmitted

9.2.5 STATUS-Client Page LOCAL STATION ERROR Section

RX Invalid NWID	Shows the number of SSIDs detected that is different from the Remote AP SSID. This number will continually count up and will count up faster in congested RF environments. It is normal to see this count increase.
RX Invalid Crypt	Represents the number of transmitted and received packets which were encrypted with the wrong encryption key and failed the decryption routines. It can be used to detect invalid wireless security settings and encryption break attempts.
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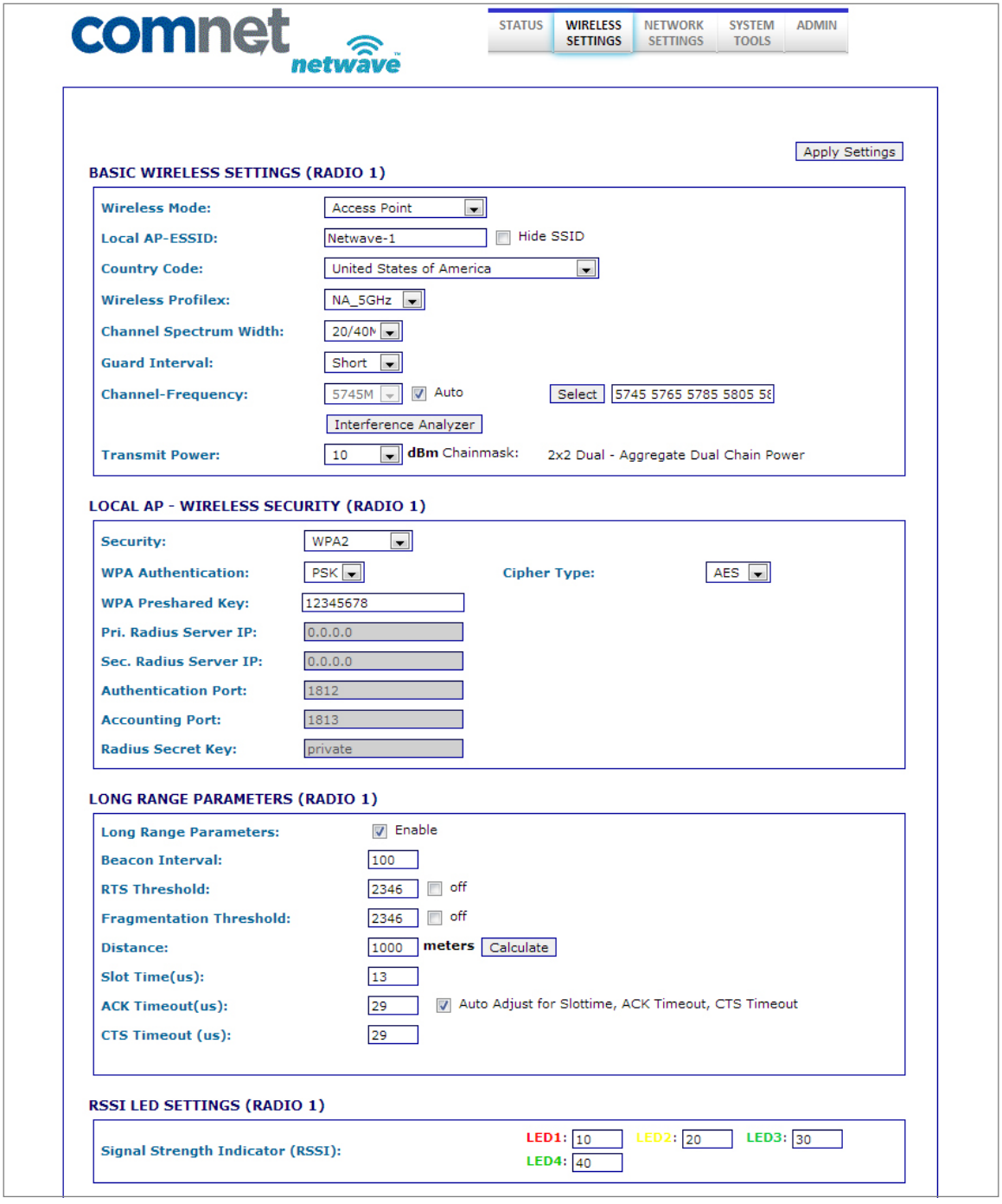
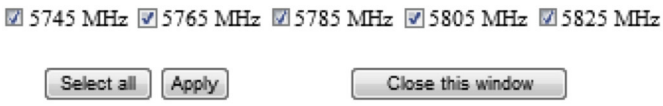
Other Errors	This count represents the total number of transmitted and received packets that were lost or discarded for reasons other than what is listed above.

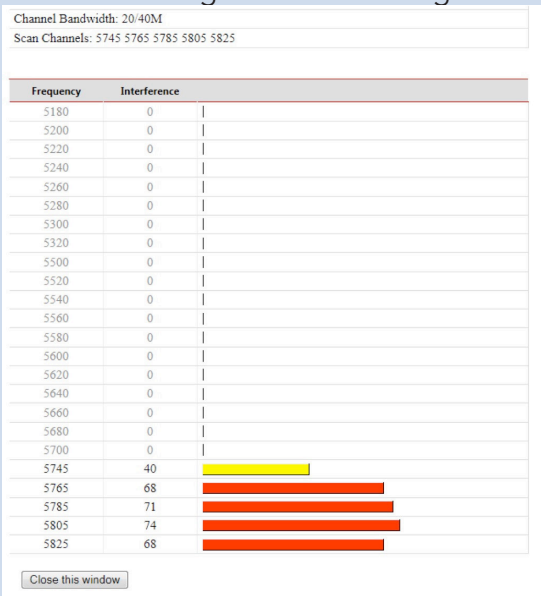
9.3 WIRELESS SETTINGS Page Radio 1 – Access Point


comnet
netwave
STATUS
WIRELESS SETTINGS
NETWORK SETTINGS
SYSTEM TOOLS
ADMIN
Apply Settings
BASIC WIRELESS SETTINGS (RADIO 1)
Wireless Mode: Access Point
Local AP-ESSID: Netwave-1 Hide SSID
Country Code: United States of America
Wireless Profilex: NA_5GHz
Channel Spectrum Width: 20/40M
Guard Interval: Short
Channel-Frequency: 5745M Auto Select 5745 5765 5785 5805 58
Interference Analyzer
Transmit Power: 10 dBm Chainmask: 2x2 Dual - Aggregate Dual Chain Power
LOCAL AP - WIRELESS SECURITY (RADIO 1)
Security: WPA2
WPA Authentication: PSK Cipher Type: AES
WPA Preshared Key: 12345678
Pri. Radius Server IP: 0.0.0.0
Sec. Radius Server IP: 0.0.0.0
Authentication Port: 1812
Accounting Port: 1813
Radius Secret Key: private
LONG RANGE PARAMETERS (RADIO 1)
Long Range Parameters: Enable
Beacon Interval: 100
RTS Threshold: 2346 off
Fragmentation Threshold: 2346 off
Distance: 1000 meters Calculate
Slot Time(us): 13
ACK Timeout(us): 29 Auto Adjust for Slottime, ACK Timeout, CTS Timeout
CTS Timeout (us): 29
RSSI LED SETTINGS (RADIO 1)
Signal Strength Indicator (RSSI): LED1: 10 LED2: 20 LED3: 30 LED4: 40

9.3.1 WIRELESS SETTINGS - AP Page BASIC WIRELESS SETTINGS Section

Note: Any settings changes made on this page will require the hitting Apply Settings button then Select Save.

Wireless Mode	The user can select either Access Point or Client mode of operation.
Local AP-ESSID	The SSID this AP will broadcast.
Country Code	A country of operation can be selected from the pull down. ***NOTE: For the FCC version, only United States will be in the list while countries participating in the ETSI harmonized standards will populate this list for the ETSI version.***
Wireless Profile	Select either NA or NG operation. NA is 802.11a and 802.11n (5GHZ operation). NG is 802.11g and 802.11n (2.4GHz operation). ***NOTE: Some models may only support the NA (5GHz) option.***
Channel Spectrum Width	The user can select the operation channel width. 20/40M lets the units determine the best channel width with the maximum 40MHz as an option under good RF conditions. One may want to choose 20MHz for noisy or congested RF environments. Options available are 20/40M, 20M, and 10M.
Guard Interval	This represents the guard interval between packets. The options are Short and Long. The Long option is recommended for links greater than 2Km in distance.
Channel Frequency	Auto is enabled by default. When Auto is unchecked, the user can select from a number of frequencies available from the drop down list. When Auto is checked and during boot up, the AP will select the operational channel with least interference.
Select Button	When pressed, a pop up screen comes up like the one below:  This allows the user to select which frequencies the AP will scan for during reboot and when Auto mode is checked/enabled.

Interference Analyzer Button	When pressed, will generate a pop up window showing all the detected AP signals like the image below: 
Transmit Power	This section will set the RF transmit power. The maximum RF power available will be limited in software based on the gain of the integrated antenna and the region the unit was programmed to operate in. The default will set the unit to maximum allowed RF power. Here the user can reduce the RF power in case the RX RSSI levels on the remote unit exceed 65.

Remember to select Apply Settings if any changes were made.

9.3.2 WIRELESS SETTINGS - AP Page WIRELESS SECURITY Section

Security	Here the end user can select the wireless security mode. Options available are None, WEP, WPA, WPA2, and 802.1x port-based security. 802.1x is for secure user-based authentication through a centralized authentication server.
WPA Authentication	Options here will set the authentication depending on the security selected above. PSK (Pre-Shared Key) is the default for WPA/WPA2 security. EAP-TTLS and EAP-PEAP are the two authentication methods for 802.1x security. ***NOTE: Operating with 802.1x security will limit link throughput to a maximum of 54Mbps.***
Cipher Type	Options for WPA/WPA2 are TKIP (Temporal Key Integrity Protocol) which uses the RC4 encryption algorithm and AES (Advanced Encryption Standard). AES is the default setting and is the recommended cipher allowing the highest link throughput. TKIP will limit throughput to a maximum of 54Mbps.

Remember to select Apply Settings if any changes were made.

Pre-shared Key	(For use with WPA security) Here an alpha-numeric between 8 and 63 character long pre-shared key can be entered.
Identity	(For use with 802.1x security) identification credential and be entered here to be used by the WPA supplicant for EAP authentication.
User Name	(For use with 802.1x security) Identification credential used by the APA supplicant for EAP – tunnelled authentication in an unencrypted form.
User Password	(For use with 802.1x security) Password credential used by the WPA supplicant for EAP authentication.

Remember to select Apply Settings if any changes were made.

9.3.3 WIRELESS SETTINGS - AP Page LONG RANGE PARAMETERS Section

Long Range Parameters	Check box to enable long range parameters. This is enabled and set to 1000m by default. 1000m should meet a majority of the system link distances but if the link distance goes beyond 1000m, this section will need to be adjusted on both ends of the link – see Distance and the Calculate Button section below.
Beacon interval	Defines the time interval (in ms) between AP beacon broadcasts. Not recommended to change the default 100ms setting.
RTS Threshold	RTS (Request to Send) threshold. This parameter controls what size data packet the low level RF protocol issues to an RTS packet. The default is 2346 with the valid range of 0-2346. There are several trade-offs to consider setting this parameter. Using a small value causes RTS packets to be sent more often, consuming more of the available bandwidth potentially reducing the throughput of the network packet. However, the more RTS packets that are sent, the quicker the system can recover from interference or collisions -- as would be the case in a wireless network with interference.
Fragmentation Threshold	Default is 2346 with a valid range is 256-2346. This parameter sets the threshold where the wireless transmission will fragment any packet if the packet size exceeds the threshold value. This setting/rule will not apply to broadcast and multicast packets.
Distance and the Calculate Button	Distance in meters that will be used to calculate Slot time, ACK timeout and CTS timeout. The default is 1000 meters but this value should be increased if the link distance goes beyond 1000m. Settings above 4000m will gradually start to affect link throughput. Once the distance value has been entered, press the Calculate button. This will update the Slot time, ACK Timeout, and CTS Timeout fields. Once these have been updated, press the Apply Settings button.

Remember to select Apply Settings if any changes were made.

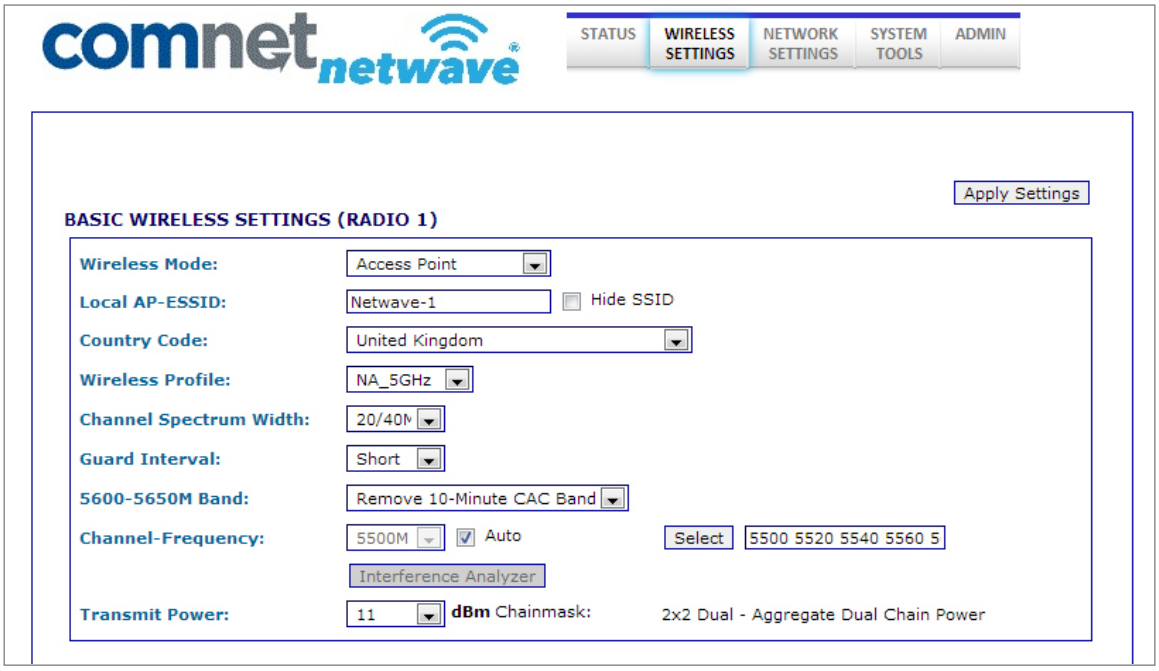
9.3.4 WIRELESS SETTINGS - AP Page RSSI LED INDICATOR Section

This section allows the user to set the LED threshold for the RSSI Indicating LEDs.

Note: LED1 on this page is not brought out on the external LED label, LED2 corresponds to Ethernet/RSSI2 on the LED label, LED3 corresponds to RSSI3, and LED4 corresponds to Status/RSSI4.

Remember to select Apply Settings if any changes were made.

9.3.5 WIRELESS SETTINGS - AP Page NW8E (ETSI Version) Only

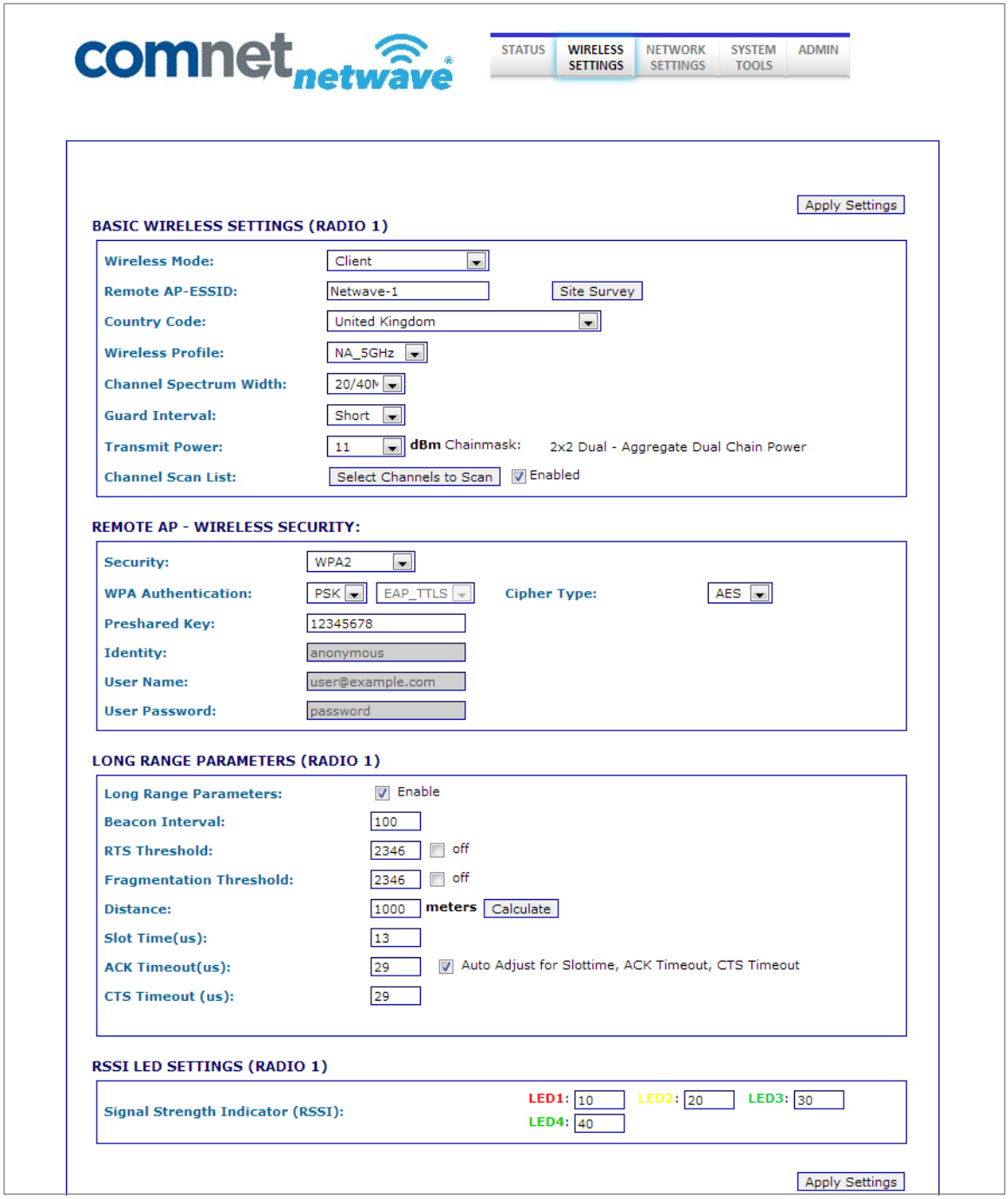


Note: Dynamic Frequency Selection (DFS) is required for all ETSI Wireless Access Points. The purpose of DFS is to have the device detect the presence of a radar system on the channel they are using and, if the level of radar is above a certain threshold, vacate the channel and select an alternate channel.
Channel Availability Check (CAC) is the time a system shall monitor a channel for presence of a radar prior to initiating a communications link on that channel.

5600-5650M Band	Enable or Disable 10-Minute CAC Band

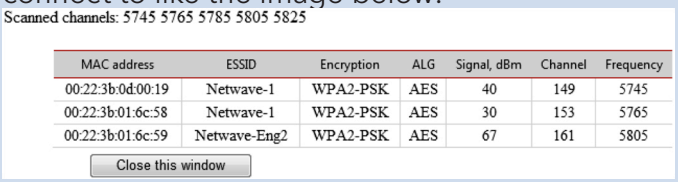
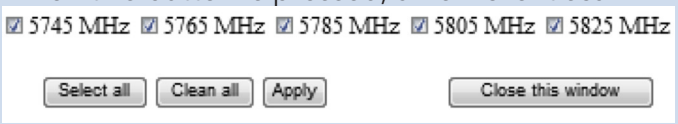
Remember to select Apply Settings if any changes were made.

9.4 WIRELESS SETTINGS - Radio 1 Client Page



9.4.1 WIRELESS SETTINGS - Radio 1 Client Page BASIC WIRELESS SETTINGS Section

Note: Any settings changes made on this page will require selecting the 'Save' pop up button then the 'Apply Settings' button.

Wireless Mode	The user can select either Access Point or Client mode of operation.
Remote AP-ESSID	Remote Access point SSID can be entered here.
Site Survey Button	When pressed, will generate a pop up screen showing all the potential APs that it can connect to like the image below:  Scanned channels: 5745 5765 5785 5805 5825 MAC address | ESSID | Encryption | ALG | Signal, dBm | Channel | Frequency 00:22:3b:0d:00:19 | Netwave-1 | WPA2-PSK | AES | 40 | 149 | 5745 00:22:3b:01:6c:58 | Netwave-1 | WPA2-PSK | AES | 30 | 153 | 5765 00:22:3b:01:6c:59 | Netwave-Eng2 | WPA2-PSK | AES | 67 | 161 | 5805 Close this window NOTE: If there is an AP you wish to connect to, just double click on the desired AP line this window will close and auto populate the Remote AP-SSID box and the Remote AP-Lock to MAC address box.
MAC Lock	When enabled this feature allows for a higher operating EIRP for FCC versions and a more secure link between the AP and Client.
Country Code	A country of operation can be selected from the pull down. ***NOTE: for the FCC version, only United States will be in the list while countries participating in the ETSI harmonized standards will populate this list for the ETSI version.***
Wireless Profile	Select either NA or NG operation. NA is 802.11a and 802.11n (5GHZ operation). NG is 802.11g and 802.11n (2.4GHz operation). ***NOTE: Some models may only support the NA (5GHz) option.***
Channel Spectrum Width	The user can select the operation channel width. 20/40M lets the units determine the best channel width with the maximum 40MHz as an option under good RF conditions. One may want to choose 20MHz for noisy or congested RF environments. Options available are 20/40M, 20M, and 10M.
Guard Interval	This represents the guard interval between packets. The options are Short and Long. The Long option is recommended for links greater than 2Km in distance.
Transmit Power	This section will set the RF transmit power. The maximum RF power available will be limited in software based on the gain of the integrated antenna and the region the unit was programmed to operate in. The default will set the unit to maximum RF power and here the user can reduce the RF power in case the RX RSSI levels on the remote unit exceed 65.
Channel Scan List	When enabled, the client will only scan the channels selected.
Select Channels To Scan Button	When this button is pressed, a new client scan window will pop up shown below:  ☑ 5745 MHz ☑ 5765 MHz ☑ 5785 MHz ☑ 5805 MHz ☑ 5825 MHz Select all Clean all Apply Close this window Here the user can select which channels the client will scan. This can reduce link lock times if the desired AP is fixed to a known frequency.

Remember to select Apply Settings if any changes were made.

9.4.2 WIRELESS SETTINGS - Radio 1 Client Page WIRELESS SECURITY Section

Security	Here the end user can select the wireless security mode. Options available are None, WEP, WPA, WPA2, and 802.1x port-based security. 802.1x is for secure user-based authentication through a centralized authentication server.
WPA Authentication	Options here will set the authentication depending on the security selected above. PSK (Pre-Shared Key) is the default for WPA/WPA2 security. EAP-TTLS and EAP-PEAP are the two authentication methods for 802.1x security. ***Note: Operating with 802.1x security will limit link throughput to a maximum of 54Mbps.***
Cipher Type	Options for WPA/WPA2 are TKIP (Temporal Key Integrity Protocol) which uses the RC4 encryption algorithm and AES (Advanced Encryption Standard). AES is the default setting and is the recommended cipher allowing the highest link throughput. TKIP will limit throughput to a maximum of 54Mbps.

Remember to select Apply Settings if any changes were made.

Pre-shared Key	(For use with WPA security) Here an alpha-numeric between 8 and 63 character long pre-shared key can be entered.
Identity	(For use with 802.1x security) identification credential and be entered here to be used by the WPA supplicant for EAP authentication.
User Name	(For use with 802.1x security) Identification credential used by the APA supplicant for EAP – tunnelled authentication in an unencrypted form.
User Password	(For use with 802.1x security) Password credential used by the WPA supplicant for EAP authentication.

Remember to select Apply Settings if any changes were made.

9.4.3 WIRELESS SETTINGS - Radio 1 Client Page LONG RANGE PARAMETERS Section

Long Range Parameters	Check box to enable long range parameters. This is enabled and set to 1000m by default. 1000m should meet a majority of the system link distances but if the link distance goes beyond 1000m, this section will need to be adjusted on both ends of the link – see Distance and the Calculate Button section below.
Beacon interval	Defines the time interval (in ms) between AP beacon broadcasts. Not recommended to change the default 100ms setting.
RTS Threshold	RTS (Request to Send) threshold. This parameter controls what size data packet the low level RF protocol issues to an RTS packet. The default is 2346 with the valid range of 0-2346. There are several trade-offs to consider setting this parameter. Using a small value causes RTS packets to be sent more often, consuming more of the available bandwidth potentially reducing the throughput of the network packet. However, the more RTS packets that are sent, the quicker the system can recover from interference or collisions -- as would be the case in a wireless network with interference.
Fragmentation Threshold	Default is 2346 with a valid range is 256-2346. This parameter sets the threshold where the wireless transmission will fragment any give packet if the packet size exceeds the threshold value. This setting/rule will not apply to broadcast and multicast packets.
Distance and the Calculate Button	Distance in meters that will be used to calculate Slot time, ACK timeout and CTS timeout. The default is 1000 meters but this value should be increased if the link distance goes beyond 1000m. Settings above 4000m will gradually start to affect link throughput. Once the distance value has been entered, press the Calculate button. This will update the Slot time, ACK Timeout, and CTS Timeout fields. Once these have been updated, press the Apply Settings button.

Remember to select Apply Settings if any changes were made.

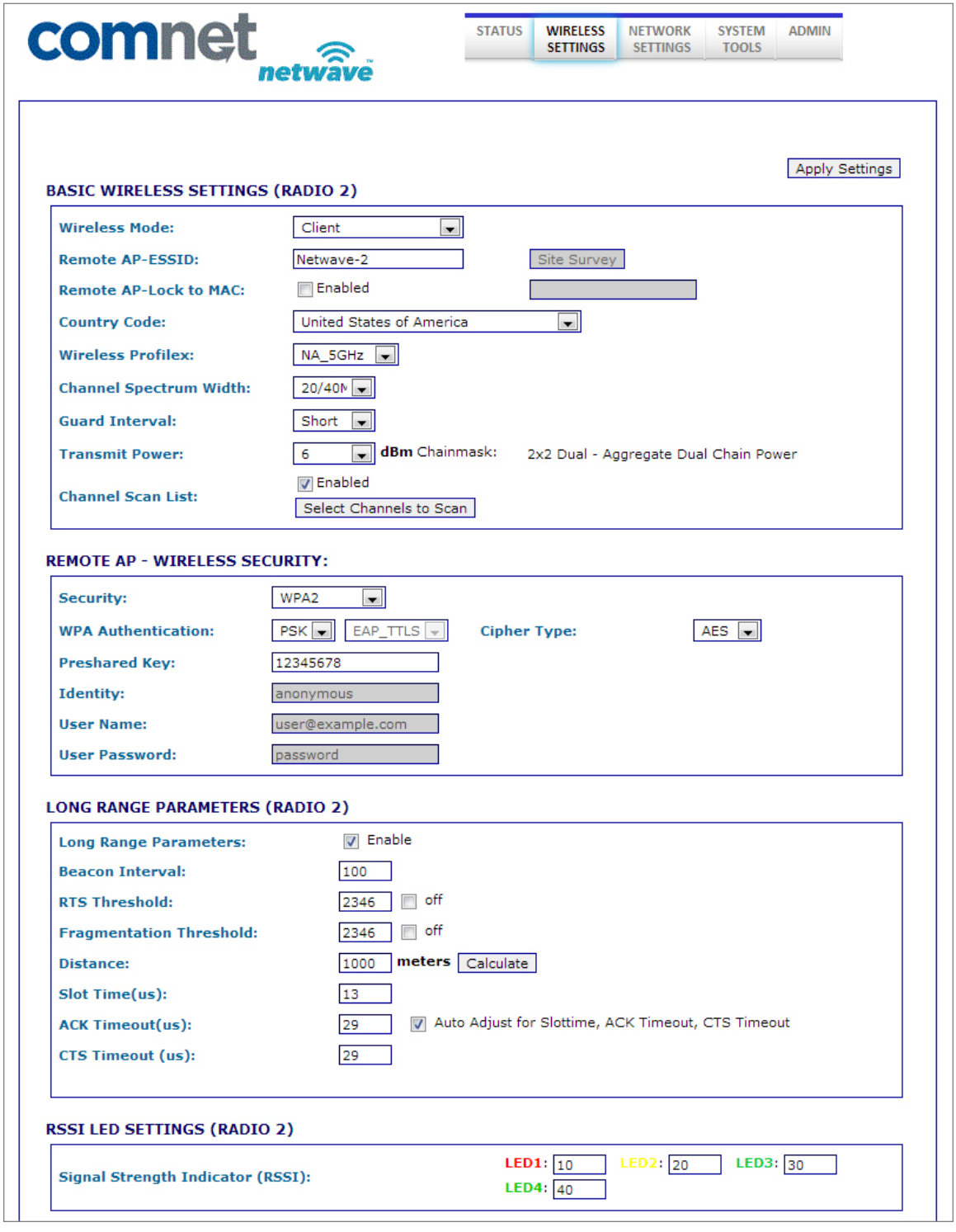
9.4.4 WIRELESS SETTINGS - Radio 1 Client Page RSSI LED INDICATOR Section

This section allows the user to set the LED threshold for the RSSI Indicating LEDs.

Note: LED1 on this page is not brought out on the external LED label, LED2 corresponds to Ethernet/RSSI2 on the LED label, LED3 corresponds to RSSI3, and LED4 corresponds to Status/RSSI4.

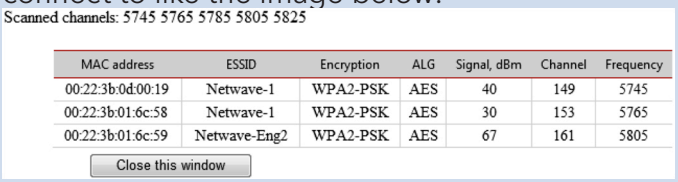
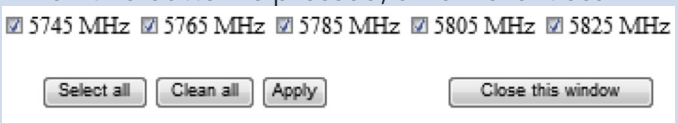
Remember to select Apply Settings if any changes were made.

9.5 WIRELESS SETTINGS – Radio 2 Client Page



9.5.1 WIRELESS SETTINGS - Radio 2 Client Page BASIC WIRELESS SETTINGS Section

Note: Any settings changes made on this page will require selecting the 'Save' pop up button then the 'Apply Settings' button.

Wireless Mode	The user can select either Access Point or Client mode of operation.
Remote AP-ESSID	Remote Access point SSID can be entered here.
Site Survey Button	When pressed, will generate a pop up screen showing all the potential APs that it can connect to like the image below:  Scanned channels: 5745 5765 5785 5805 5825 MAC address | ESSID | Encryption | ALG | Signal, dBm | Channel | Frequency 00:22:3b:0d:00:19 | Netwave-1 | WPA2-PSK | AES | 40 | 149 | 5745 00:22:3b:01:6c:58 | Netwave-1 | WPA2-PSK | AES | 30 | 153 | 5765 00:22:3b:01:6c:59 | Netwave-Eng2 | WPA2-PSK | AES | 67 | 161 | 5805 Close this window NOTE: If there is an AP you wish to connect to, just double click on the desired AP line this window will close and auto populate the Remote AP-SSID box and the Remote AP-Lock to MAC address box.
MAC Lock	When enabled this feature allows for a higher operating EIRP for FCC versions and a more secure link between the AP and Client.
Country Code	A country of operation can be selected from the pull down. ***NOTE: for the FCC version, only United States will be in the list while countries participating in the ETSI harmonized standards will populate this list for the ETSI version.***
Wireless Profile	Select either NA or NG operation. NA is 802.11a and 802.11n (5GHZ operation). NG is 802.11g and 802.11n (2.4GHz operation). ***NOTE: Some models may only support the NA (5GHz) option.***
Channel Spectrum Width	The user can select the operation channel width. 20/40M lets the units determine the best channel width with the maximum 40MHz as an option under good RF conditions. One may want to choose 20MHz for noisy or congested RF environments. Options available are 20/40M, 20M, and 10M.
Guard Interval	This represents the guard interval between packets. The options are Short and Long. The Long option is recommended for links greater than 2Km in distance.
Transmit Power	This section will set the RF transmit power. The maximum RF power available will be limited in software based on the gain of the integrated antenna and the region the unit was programmed to operate in. The default will set the unit to maximum RF power and here the user can reduce the RF power in case the RX RSSI levels on the remote unit exceed 65.
Channel Scan List	When enabled, the client will only scan the channels selected.
Select Channels To Scan Button	When this button is pressed, a new client scan window will pop up shown below:  ☑ 5745 MHz ☑ 5765 MHz ☑ 5785 MHz ☑ 5805 MHz ☑ 5825 MHz Select all Clean all Apply Close this window Here the user can select which channels the client will scan. This can reduce link lock times if the desired AP is fixed to a known frequency.

Remember to select Apply Settings if any changes were made.

9.5.2 WIRELESS SETTINGS - Radio 2 Client Page WIRELESS SECURITY Section

Security	Here the end user can select the wireless security mode. Options available are None, WEP, WPA, WPA2, and 802.1x port-based security. 802.1x is for secure user-based authentication through a centralized authentication server.
WPA Authentication	Options here will set the authentication depending on the security selected above. PSK (Pre-Shared Key) is the default for WPA/WPA2 security. EAP-TTLS and EAP-PEAP are the two authentication methods for 802.1x security. ***Note: Operating with 802.1x security will limit link throughput to a maximum of 54Mbps.***
Cipher Type	Options for WPA/WPA2 are TKIP (Temporal Key Integrity Protocol) which uses the RC4 encryption algorithm and AES (Advanced Encryption Standard). AES is the default setting and is the recommended cipher allowing the highest link throughput. TKIP will limit throughput to a maximum of 54Mbps.

Remember to select Apply Settings if any changes were made.

Pre-shared Key	(For use with WPA security) Here an alpha-numeric between 8 and 63 character long pre-shared key can be entered.
Identity	(For use with 802.1x security) identification credential and be entered here to be used by the WPA supplicant for EAP authentication.
User Name	(For use with 802.1x security) Identification credential used by the APA supplicant for EAP – tunnelled authentication in an unencrypted form.
User Password	(For use with 802.1x security) Password credential used by the WPA supplicant for EAP authentication.

Remember to select Apply Settings if any changes were made.

9.5.3 WIRELESS SETTINGS - Radio 2 Client Page LONG RANGE PARAMETERS Section

Long Range Parameters	Check box to enable long range parameters. This is enabled and set to 1000m by default. 1000m should meet a majority of the system link distances but if the link distance goes beyond 1000m, this section will need to be adjusted on both ends of the link – see Distance and the Calculate Button section below.
Beacon interval	Defines the time interval (in ms) between AP beacon broadcasts. Not recommended to change the default 100ms setting.
RTS Threshold	RTS (Request to Send) threshold. This parameter controls what size data packet the low level RF protocol issues to an RTS packet. The default is 2346 with the valid range of 0-2346. There are several trade-offs to consider setting this parameter. Using a small value causes RTS packets to be sent more often, consuming more of the available bandwidth potentially reducing the throughput of the network packet. However, the more RTS packets that are sent, the quicker the system can recover from interference or collisions -- as would be the case in a wireless network with interference.
Fragmentation Threshold	Default is 2346 with a valid range is 256-2346. This parameter sets the threshold where the wireless transmission will fragment any give packet if the packet size exceeds the threshold value. This setting/rule will not apply to broadcast and multicast packets.
Distance and the Calculate Button	Distance in meters that will be used to calculate Slot time, ACK timeout and CTS timeout. The default is 1000 meters but this value should be increased if the link distance goes beyond 1000m. Settings above 4000m will gradually start to affect link throughput. Once the distance value has been entered, press the Calculate button. This will update the Slot time, ACK Timeout, and CTS Timeout fields. Once these have been updated, press the Apply Settings button.

Remember to select Apply Settings if any changes were made.

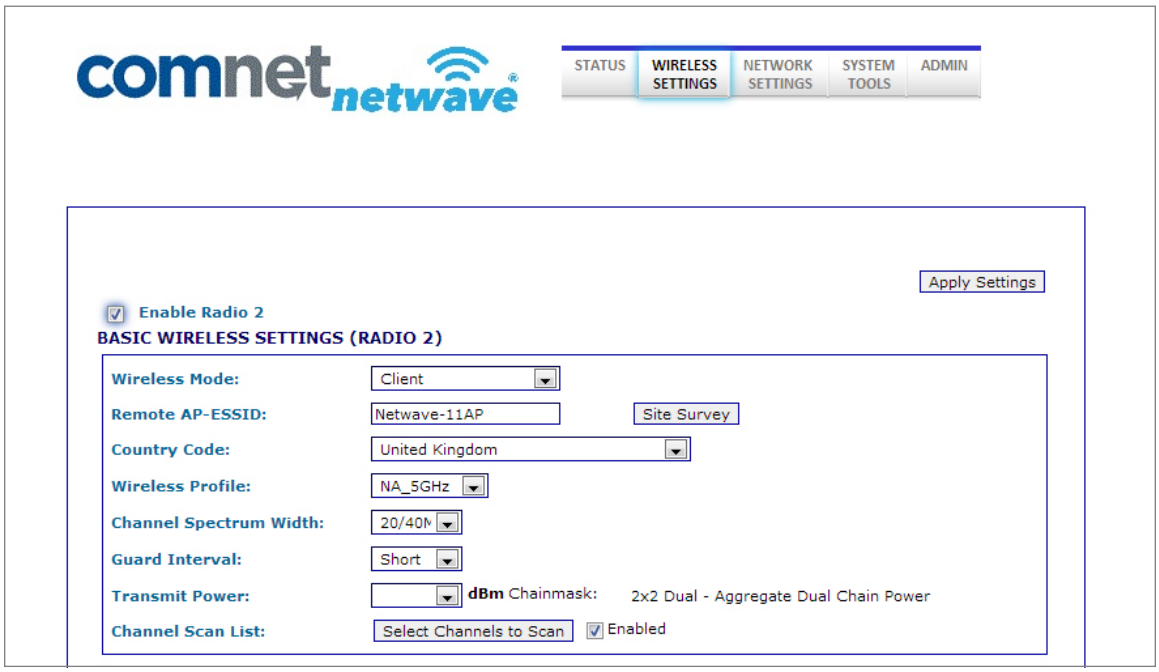
9.5.4 WIRELESS SETTINGS - Radio 2 Client Page RSSI LED INDICATOR Section

This section allows the user to set the LED threshold for the RSSI Indicating LEDs.

Note: LED1 on this page is not brought out on the external LED label, LED2 corresponds to Ethernet/RSSI2 on the LED label, LED3 corresponds to RSSI3, and LED4 corresponds to Status/RSSI4.

Remember to select Apply Settings if any changes were made.

9.5.5 WIRELESS SETTINGS - Radio 2 Client Page NW8E (ETSI Version) Only

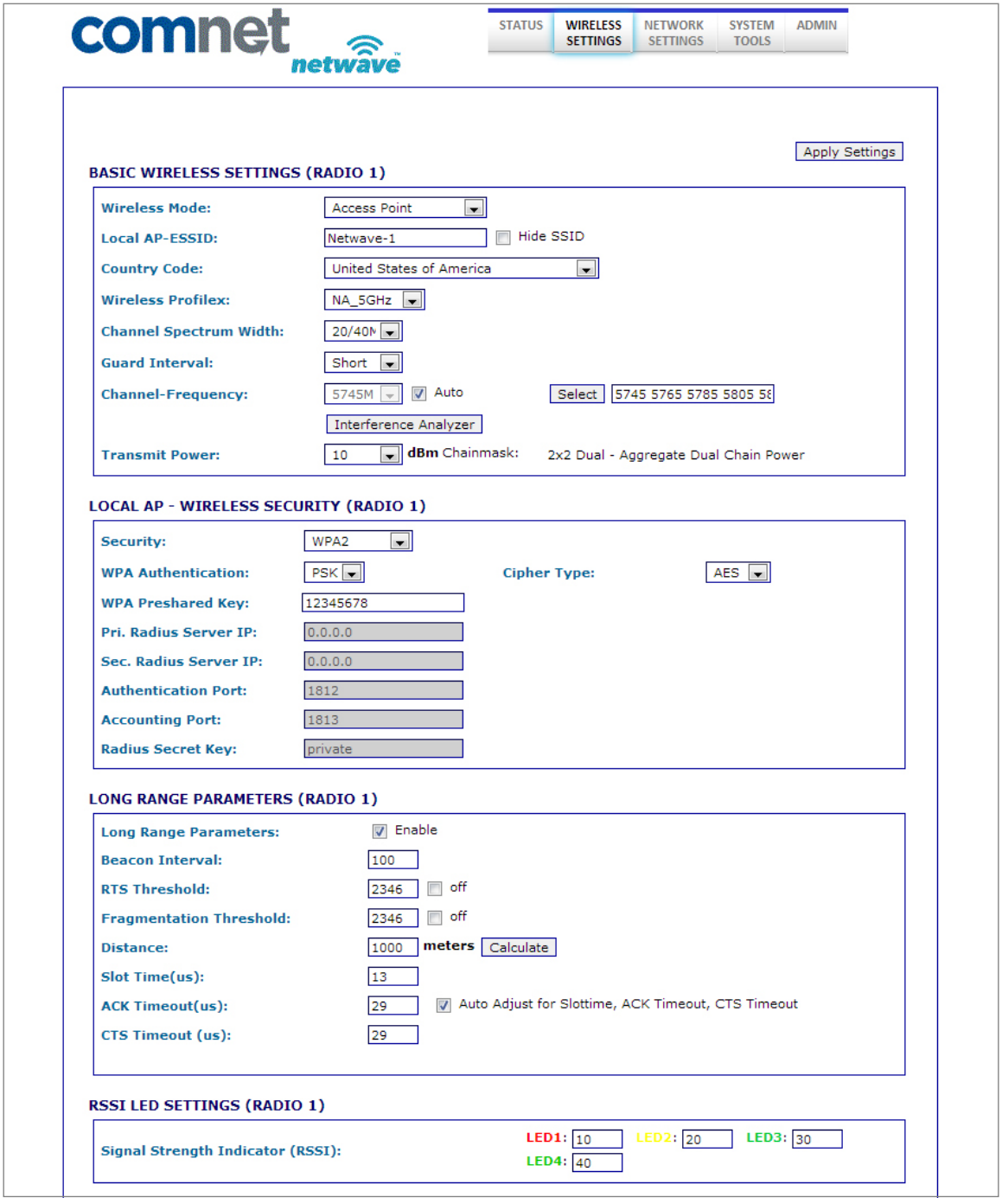


Note: The ETSI version of the NetWave NW8E has the added feature of being able to enable or disable Radio 2

Enable Radio 2	Enable or Disable Radio 2

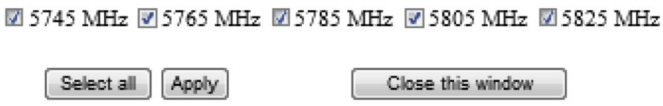
Remember to select Apply Settings if any changes were made.

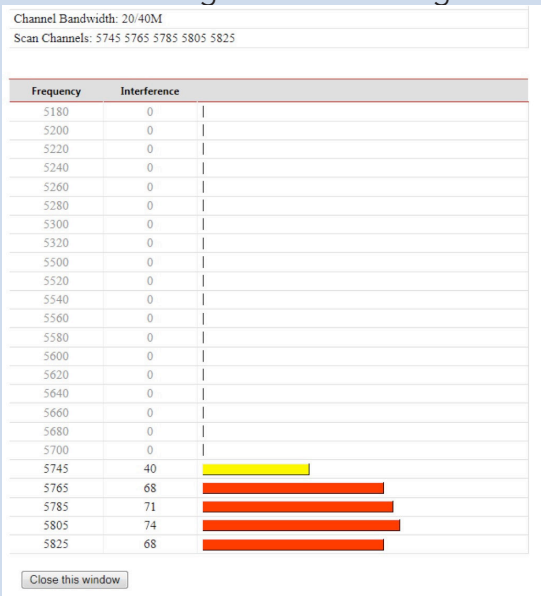
9.6 WIRELESS SETTINGS Page Radio 2 – Access Point


comnet
netwave
STATUS
WIRELESS SETTINGS
NETWORK SETTINGS
SYSTEM TOOLS
ADMIN
Apply Settings
BASIC WIRELESS SETTINGS (RADIO 1)
Wireless Mode: Access Point
Local AP-ESSID: Netwave-1 Hide SSID
Country Code: United States of America
Wireless Profilex: NA_5GHz
Channel Spectrum Width: 20/40M
Guard Interval: Short
Channel-Frequency: 5745M Auto Select 5745 5765 5785 5805 58
Interference Analyzer
Transmit Power: 10 dBm Chainmask: 2x2 Dual - Aggregate Dual Chain Power
LOCAL AP - WIRELESS SECURITY (RADIO 1)
Security: WPA2
WPA Authentication: PSK Cipher Type: AES
WPA Preshared Key: 12345678
Pri. Radius Server IP: 0.0.0.0
Sec. Radius Server IP: 0.0.0.0
Authentication Port: 1812
Accounting Port: 1813
Radius Secret Key: private
LONG RANGE PARAMETERS (RADIO 1)
Long Range Parameters: Enable
Beacon Interval: 100
RTS Threshold: 2346 off
Fragmentation Threshold: 2346 off
Distance: 1000 meters Calculate
Slot Time(us): 13
ACK Timeout(us): 29 Auto Adjust for Slottime, ACK Timeout, CTS Timeout
CTS Timeout (us): 29
RSSI LED SETTINGS (RADIO 1)
Signal Strength Indicator (RSSI): LED1: 10 LED2: 20 LED3: 30 LED4: 40

9.6.1 WIRELESS SETTINGS - Radio 2 AP Page BASIC WIRELESS SETTINGS Section

Note: Any settings changes made on this page will require the hitting Apply Settings button then Select Save.

Wireless Mode	The user can select either Access Point or Client mode of operation.
Local AP-ESSID	The SSID this AP will broadcast.
Country Code	A country of operation can be selected from the pull down. ***NOTE: For the FCC version, only United States will be in the list while countries participating in the ETSI harmonized standards will populate this list for the ETSI version.***
Wireless Profile	Select either NA or NG operation. NA is 802.11a and 802.11n (5GHZ operation). NG is 802.11g and 802.11n (2.4GHz operation). ***NOTE: Some models may only support the NA (5GHz) option.***
Channel Spectrum Width	The user can select the operation channel width. 20/40M lets the units determine the best channel width with the maximum 40MHz as an option under good RF conditions. One may want to choose 20MHz for noisy or congested RF environments. Options available are 20/40M, 20M, and 10M.
Guard Interval	This represents the guard interval between packets. The options are Short and Long. The Long option is recommended for links greater than 2Km in distance.
Channel Frequency	Auto is enabled by default. When Auto is unchecked, the user can select from a number of frequencies available from the drop down list. When Auto is checked and during boot up, the AP will select the operational channel with least interference.
Select Button	When pressed, a pop up screen comes up like the one below:  This allows the user to select which frequencies the AP will scan for during reboot and when Auto mode is checked/enabled.

Interference Analyzer Button	When pressed, will generate a pop up window showing all the detected AP signals like the image below: 
Transmit Power	This section will set the RF transmit power. The maximum RF power available will be limited in software based on the gain of the integrated antenna and the region the unit was programmed to operate in. The default will set the unit to maximum allowed RF power. Here the user can reduce the RF power in case the RX RSSI levels on the remote unit exceed 65.

Remember to select Apply Settings if any changes were made.

9.6.2 WIRELESS SETTINGS - Radio 2 AP Page WIRELESS SECURITY Section

Security	Here the end user can select the wireless security mode. Options available are None, WEP, WPA, WPA2, and 802.1x port-based security. 802.1x is for secure user-based authentication through a centralized authentication server.
WPA Authentication	Options here will set the authentication depending on the security selected above. PSK (Pre-Shared Key) is the default for WPA/WPA2 security. EAP-TTLS and EAP-PEAP are the two authentication methods for 802.1x security. ***NOTE: Operating with 802.1x security will limit link throughput to a maximum of 54Mbps.***
Cipher Type	Options for WPA/WPA2 are TKIP (Temporal Key Integrity Protocol) which uses the RC4 encryption algorithm and AES (Advanced Encryption Standard). AES is the default setting and is the recommended cipher allowing the highest link throughput. TKIP will limit throughput to a maximum of 54Mbps.

Remember to select Apply Settings if any changes were made.

Pre-shared Key	(For use with WPA security) Here an alpha-numeric between 8 and 63 character long pre-shared key can be entered.
Identity	(For use with 802.1x security) identification credential and be entered here to be used by the WPA supplicant for EAP authentication.
User Name	(For use with 802.1x security) Identification credential used by the APA supplicant for EAP – tunnelled authentication in an unencrypted form.
User Password	(For use with 802.1x security) Password credential used by the WPA supplicant for EAP authentication.

Remember to select Apply Settings if any changes were made.

9.6.3 WIRELESS SETTINGS - Radio 2 AP Page LONG RANGE PARAMETERS Section

Long Range Parameters	Check box to enable long range parameters. This is enabled and set to 1000m by default. 1000m should meet a majority of the system link distances but if the link distance goes beyond 1000m, this section will need to be adjusted on both ends of the link – see Distance and the Calculate Button section below.
Beacon interval	Defines the time interval (in ms) between AP beacon broadcasts. Not recommended to change the default 100ms setting.
RTS Threshold	RTS (Request to Send) threshold. This parameter controls what size data packet the low level RF protocol issues to an RTS packet. The default is 2346 with the valid range of 0-2346. There are several trade-offs to consider setting this parameter. Using a small value causes RTS packets to be sent more often, consuming more of the available bandwidth potentially reducing the throughput of the network packet. However, the more RTS packets that are sent, the quicker the system can recover from interference or collisions -- as would be the case in a wireless network with interference.
Fragmentation Threshold	Default is 2346 with a valid range is 256-2346. This parameter sets the threshold where the wireless transmission will fragment any packet if the packet size exceeds the threshold value. This setting/rule will not apply to broadcast and multicast packets.
Distance and the Calculate Button	Distance in meters that will be used to calculate Slot time, ACK timeout and CTS timeout. The default is 1000 meters but this value should be increased if the link distance goes beyond 1000m. Settings above 4000m will gradually start to affect link throughput. Once the distance value has been entered, press the Calculate button. This will update the Slot time, ACK Timeout, and CTS Timeout fields. Once these have been updated, press the Apply Settings button.

Remember to select Apply Settings if any changes were made.

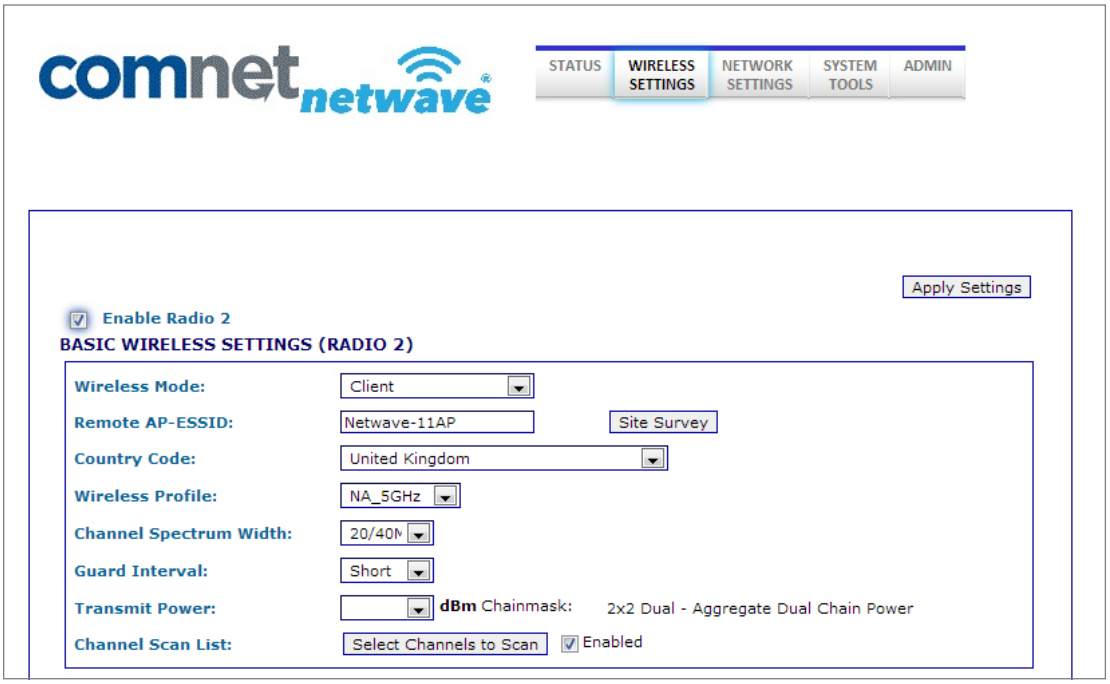
9.6.4 WIRELESS SETTINGS - Radio 2 AP Page RSSI LED INDICATOR Section

This section allows the user to set the LED threshold for the RSSI Indicating LEDs.

Note: LED1 on this page is not brought out on the external LED label, LED2 corresponds to Ethernet/RSSI2 on the LED label, LED3 corresponds to RSSI3, and LED4 corresponds to Status/RSSI4.

Remember to select Apply Settings if any changes were made.

9.6.5 WIRELESS SETTINGS - RADIO 2 AP Page ETSI Version Only

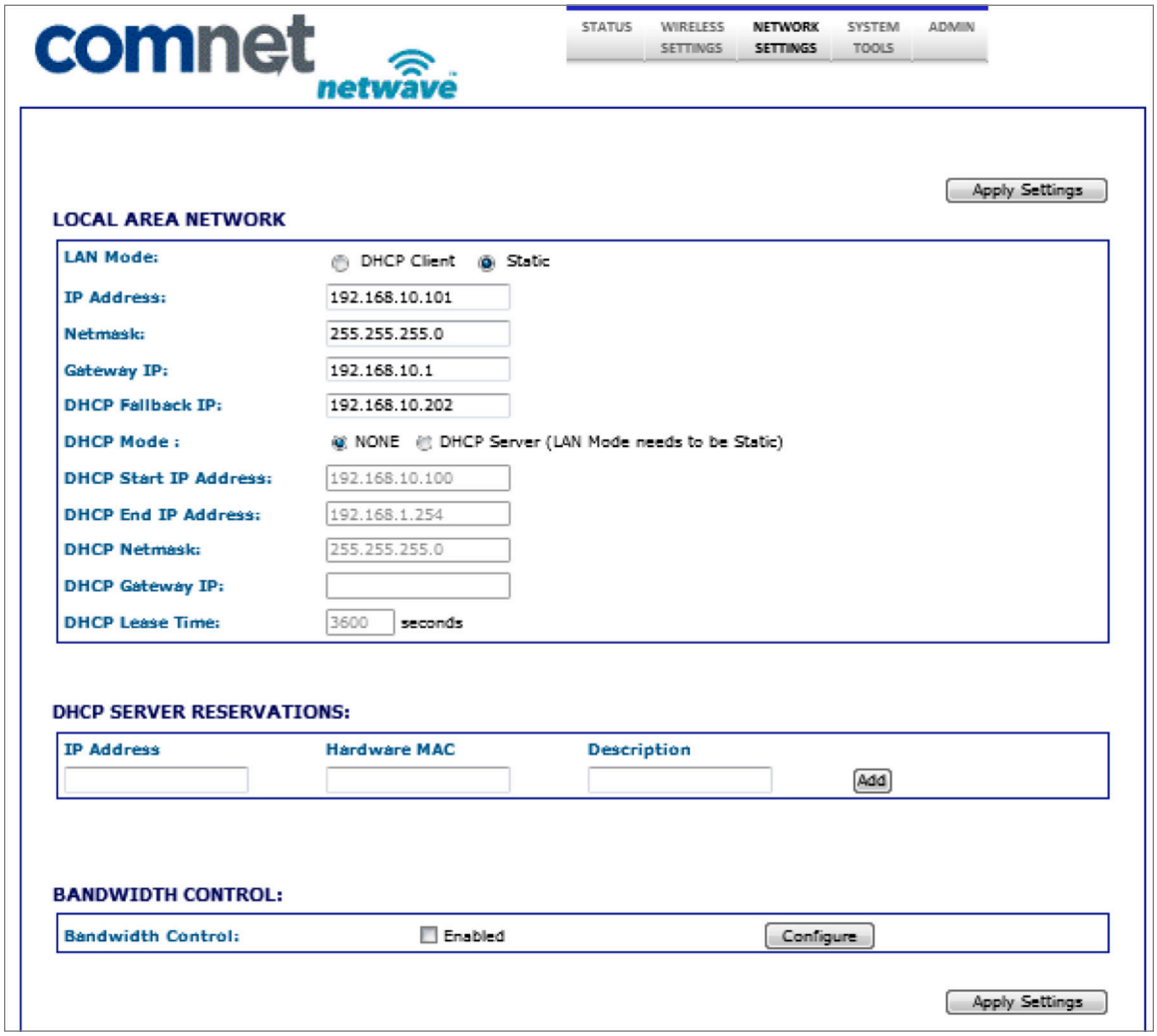


Note: The ETSI version of the NetWave NW8E has the added feature of being able to enable or disable Radio 2

Enable Radio 2	Enable or Disable Radio 2

Remember to select Apply Settings if any changes were made.

9.7 NETWORK SETTINGS Page – Client or Access Point



9.7.1 NETWORK SETTINGS Page LOCAL AREA NETWORK Section

LAN Mode	Embedded web server addressing mode. Options are static or dynamic for an address from a local DHCP server.
IP Address	For setting the static address for the embedded web server.
Netmask	Static network mask
Gateway IP	Static gateway IP address
DHCP Fallback IP	This will be the address the web server will default to if it cannot establish communications with a DHCP server
DHCP Mode	This enables an option to make the node act as a DHCP server. Note: Can only set DHCP server if the node is statically addressed. Once the DHCP Server option has been selected, DHCP option fields below are enabled for entry.
DHCP Start IP Address	DHCP address block start address

DHCP Stop IP Address	DHCP address block stop address
DHCP Netmask	DHCP Network mask that the DHCP sever will pass to the DHCP clients
DHCP Gateway IP	IP address for the network segment gateway that the DHCP sever will pass to the DHCP clients
DHCP Lease Times	Lease time for the DHCP addresses. Default is 1 hour or 3600 seconds.

Remember to select Apply Settings if any changes were made.

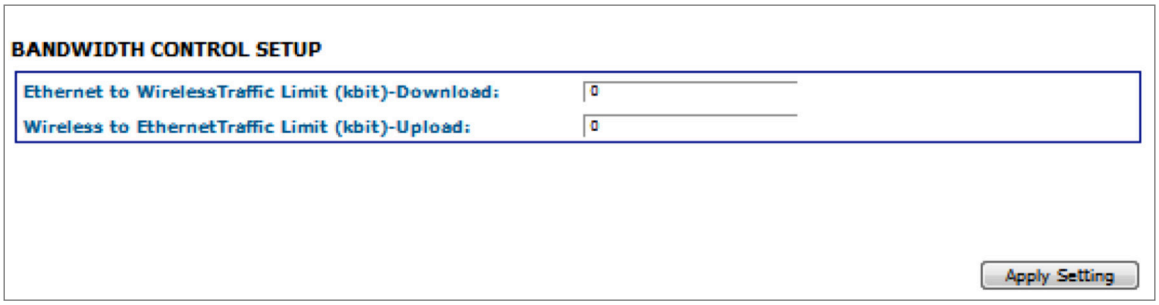
9.7.2 NETWORK SETTINGS Page DHCP SERVER RESERVATIONS Section

Here one can assign IP addresses to specific MAC addresses. Once the IP address and MAC address has been entered, click the ADD button. Make sure the IP address assigned is within the DHCP start and end address block.

Remember to select Apply Settings if any changes were made.

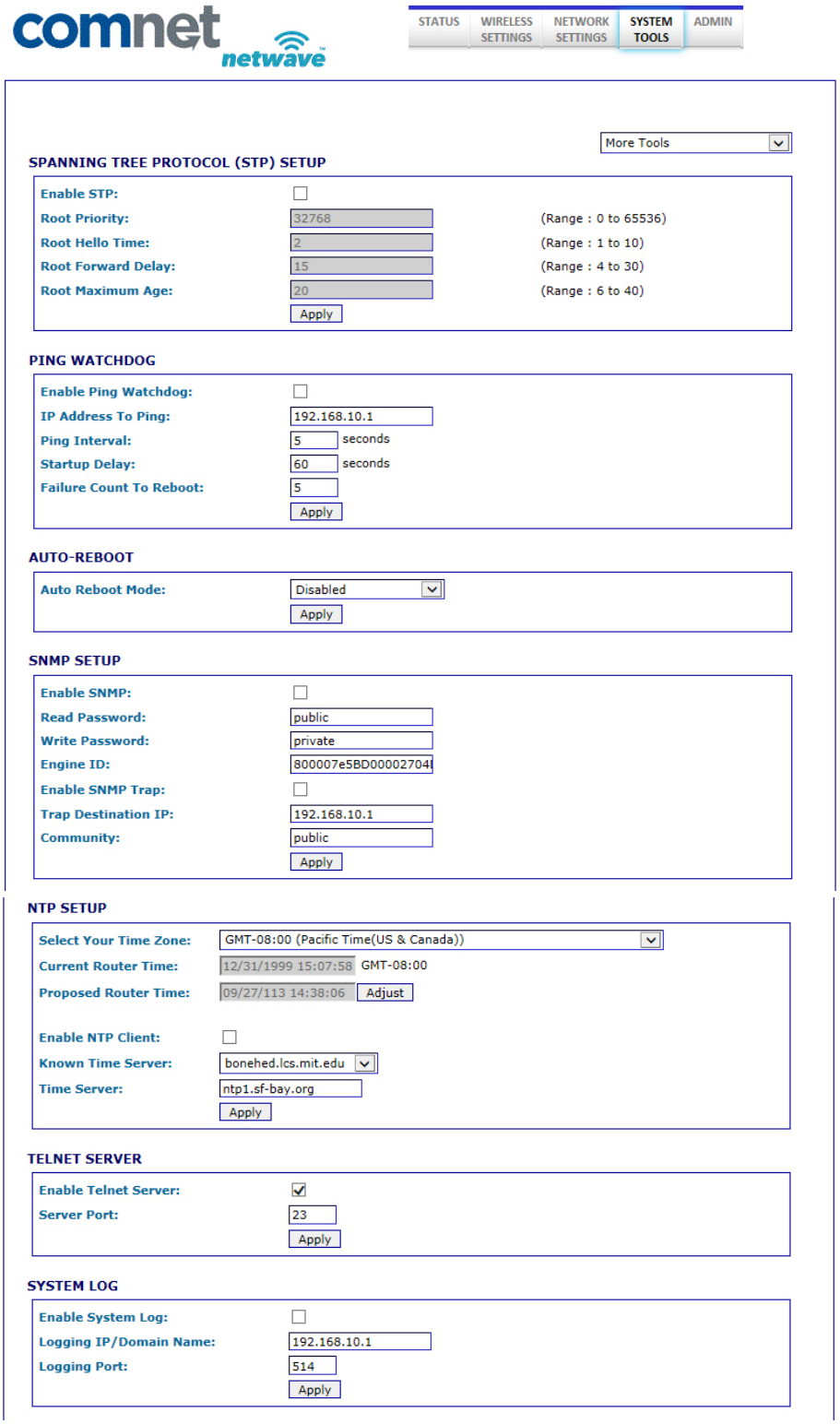
9.7.3 NETWORK SETTINGS Page BANDWIDTH CONTROL Section

When enabled is checked, this will limit up and download speeds specified by the page that will launch when the configure button is pressed as shown below:



Enter in the throughput limiting values for upload and download then hit the Apply Setting button. This feature could be useful when configuring clients connecting to a single multipoint AP or in a repeating system thus keeping within the maximum throughput of any one hop or multipoint AP.

9.8 SYSTEM TOOLS Page – Client and Access Point



9.8.1 SYSTEM TOOLS Page STP Section

Enable STP	Not enabled by default
Root Priority	Allows the user to set priorities in each node used during the root bridge selection process.
Root Hello Timer	For setting STP hello times. Default is 2
Root Forward Delay	For setting STP forward delay. Default is 15
Root Max Age	For setting STP maximum age timer. Default is 20

Remember to select Apply if any changes were made.

9.8.2 SYSTEM TOOLS Page PING WATCHDOG Section

The ping watchdog utility can be a useful tool if a node needs to be periodically rebooted. Wireless equipment can sometimes require reboot to re-establish a connection if operating in noisy environments

Enable Ping Watchdog	Not enabled by default.
IP Address to ping	Network address that the watchdog utility will ping.
Ping Interval	Interval in seconds that the watchdog utility will send ICMP ping requests out. Default is 5 seconds
Startup Delay	One time delay after node is booted. Default is 60 seconds.
Failure Count to Reboot	The number of successive ping failures before the node will initiate a reboot.

Remember to select Apply if any changes were made.

9.8.3 SYSTEM TOOLS Page AUTO-REBOOT Section

This can bet set to reboot a certain time every day or by a set number of hours. This is disabled by default.

Remember to select Apply if any changes were made.

9.8.4 SYSTEM TOOLS Page SNMP SETUP Section

Enable SNMP	Not enabled by default
Read Password	Password to query the device
Engine ID	Engine ID for the SNMP agent. Default is 800007e5BD00002704D000007c
Enable SNMP trap	Not enabled by default.
Trap Destination IP	Destination IP address where the trap messages will be sent.
Community	Enter the SNMP community string

Remember to select Apply if any changes were made.

9.8.5 SYSTEM TOOLS Page NTP SETUP Section

Select your Time Zone:

Current Router Time	This is the time the node is set to. This will be updated and displayed in the STATUS page by either setting to the browsing computer system clock or by a connected NTP server.
Proposed Router Time	This will display the system clock of the device that is browsing to the node. If the Adjust button is pressed, The time displayed in this box will overwrite the clock on the device.
Enable NTP Client	not enabled by default.
Known Time Server	Select a time server from the drop down list. Note: The node will need to have access to the internet to connect to any one of these servers.
Time server	Manually enter in a time server if the desired one is not in the Known Timer Server list.

Remember to select Apply if any changes were made.

9.8.6 SYSTEM TOOLS Page TELNET SERVER Section

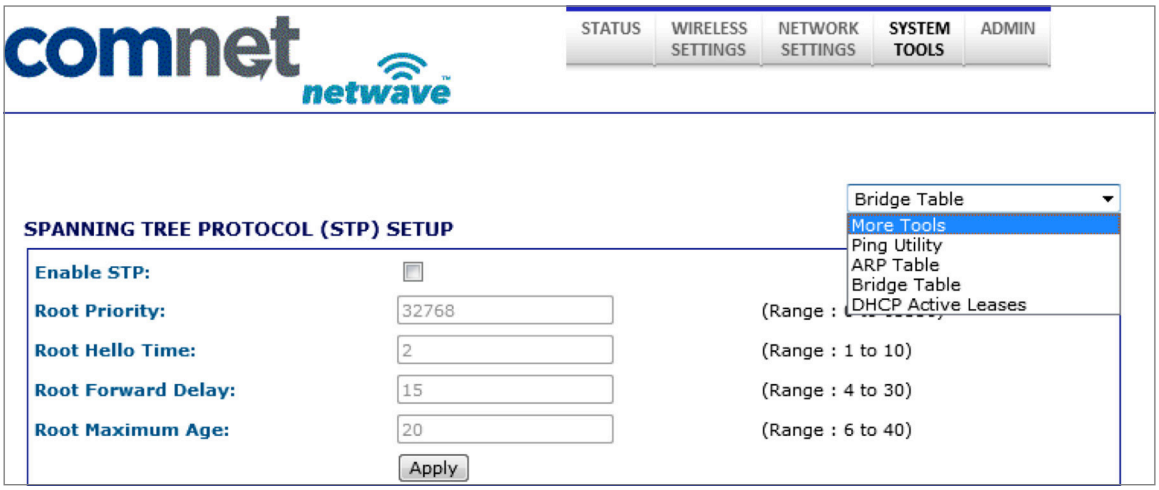
Enable Telnet Server	Enabled by default
Telnet server port	Port 23 is the default

9.8.7 SYSTEM TOOLS Page SYSTEM SERVER Section

Enable Syslog	Not enabled by default
Logging IP/ Domain Name	Enter in the destination IP address of the device to receive the system log
Logging port	Port 514 is the default. Port 514 is common for receiving UDP system logs

9.8.8 SYSTEM TOOLS Page MORE TOOLS Dropdown menu

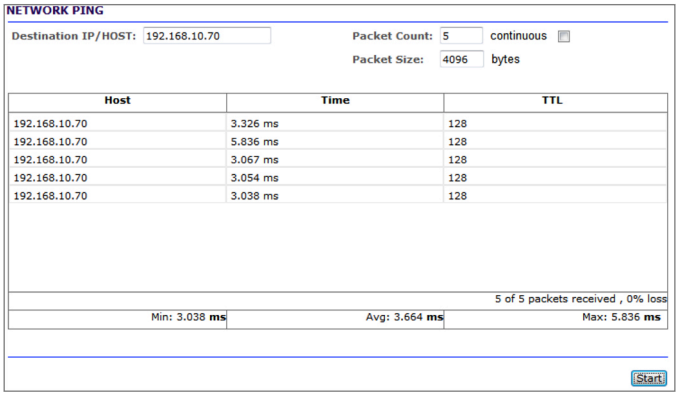
A More Tools pull down menu is present in the top right hand section of the SYSTEM TOOLs page as shown below:



Ping Utility

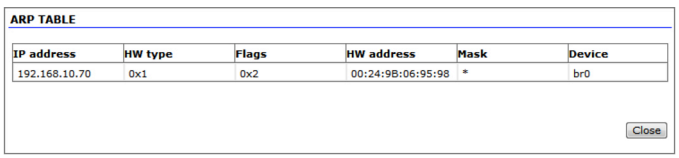
Use this utility to test network connections using ICMP ping.

When Ping Utility is selected, a pop up screen with come up as shown below:



ARP Table

When ARP Table is selected, the below pop up screen comes up listing all ARP entries:



Bridge Table

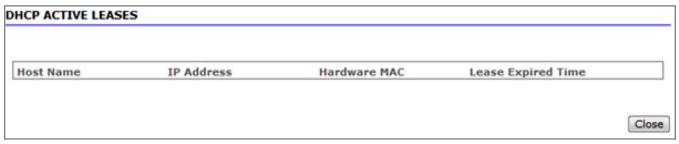
This table displays a list of devices connected to the node bridge interface as shown below

BRIDGE TABLE

Port No	Mac Address	Is Local	Agein Timer
2	00:10:83:5b:ee:46	no	87.48
2	00:13:21:0d:51:48	no	7.23
2	00:18:f8:a9:c3:bf	no	104.87
2	00:19:d1:6b:13:32	no	63.66
2	00:1a:a0:de:2d:86	no	29.82
2	00:1b:78:30:40:e6	no	33.78
2	00:1b:78:ba:20:8a	no	5.62

DHCP Active Leases

This table displays a list of active DHCP leases if this node were configured as a DHCP server.

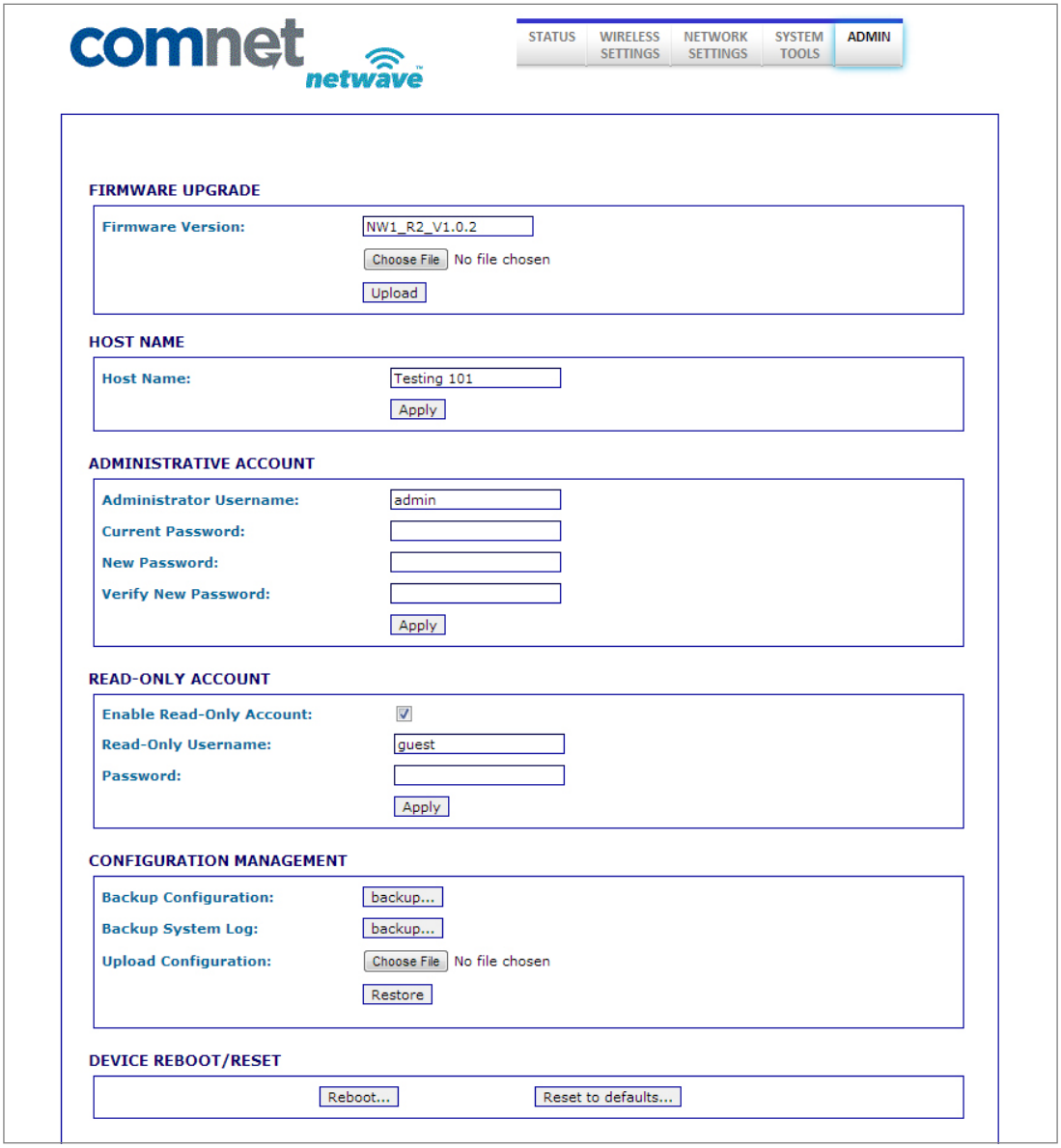


DHCP ACTIVE LEASES

Host Name	IP Address	Hardware MAC	Lease Expired Time

Close

9.9 ADMIN Page – Client or Access Point

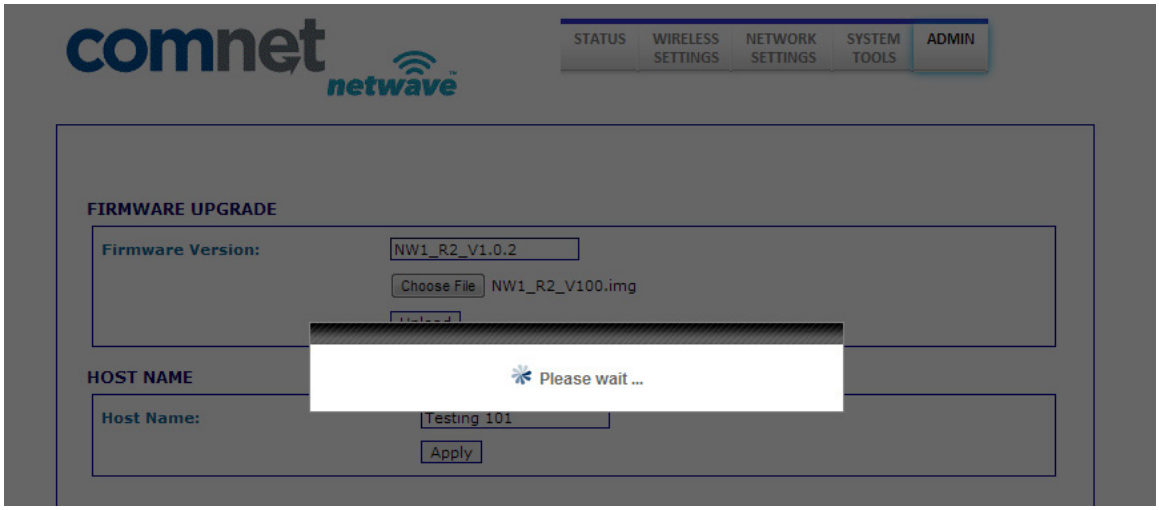


9.9.1 ADMIN Page FIRMWARE UPGRADE Section

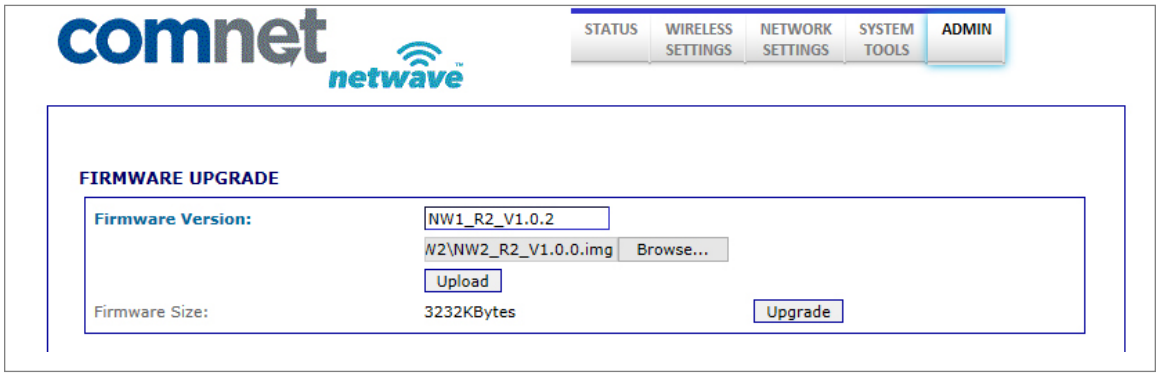
Firmware Version: Displays the version currently running

Firmware Upgrade procedure:

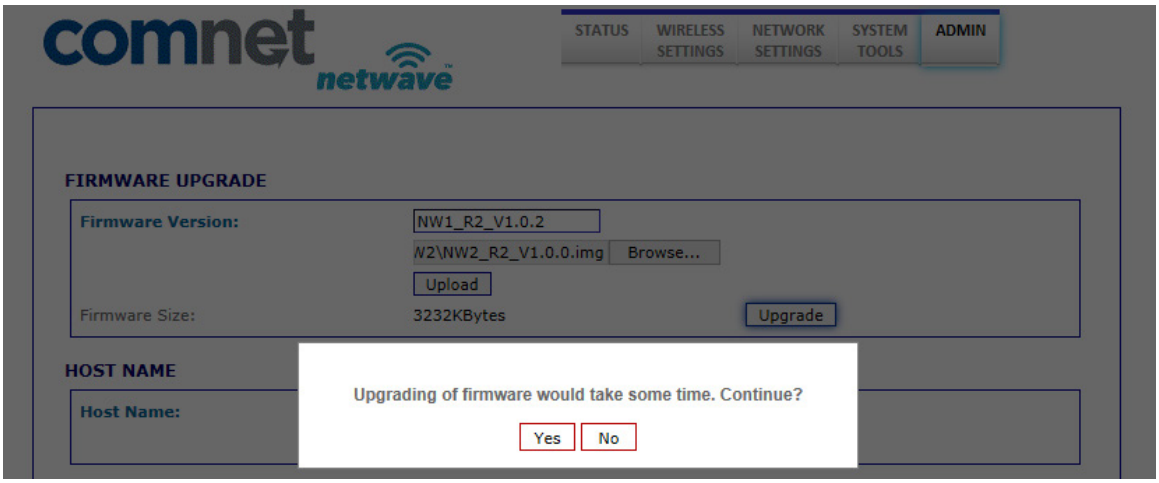
- Press the browse button to browse to a location where the upgrade image is located
- Once the file has been located hit the Upload button. You should see the following screen while the image is uploading:



- Once the image has been uploaded, an Upgrade button will appear as shown:



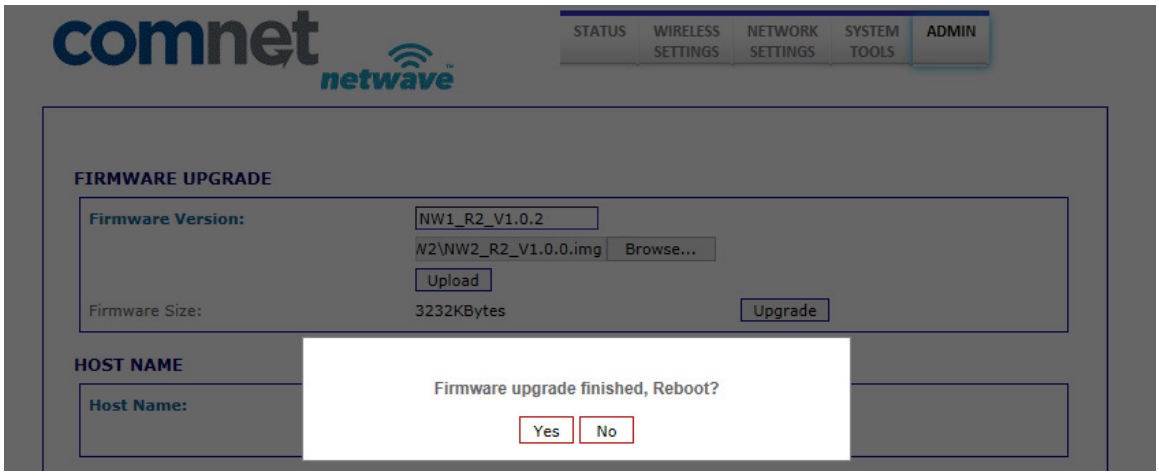
- Press the upgrade button and you should see a prompt confirming the upgrade to continue. Select Yes:



- The following screen will now show reminding the user to not reboot during an upgrade process. This screen should render for at least 60 seconds if the PC browsing to this particular node is locally connected.

Note: If a firmware upgrade is being performed on a node connected on the remote end of a wireless connection, It may take several minutes for this screen to clear as the link needs to re-establish and connections to restart. One may have to clear ARP cash on the connected PC by issuing arp –d command at the command prompt.

- The last screen will confirm to reboot. Hit Yes.



- Unit will reboot and the page will refresh after about 60 seconds.
- It is recommended that a factory reset be performed by hitting the Restore to Default button at the bottom of the ADMIN page but may not be required. Consult ComNet tech support for further detail on the particular upgrade or refer to the firmware release notes.
- End of Firmware upgrade procedure

9.9.2 ADMIN Page HOST NAME Section

Enter in the desired host name.

Remember to select Apply if any changes were made.

9.9.3 ADMIN Page ADMIN ACCOUNT Section

Administrator Username	Default is **admin**
Current Password	Default is **admin**

Remember to select Apply if any changes were made.

9.9.4 ADMIN Page READ-ONLY ACCOUNT Section

The read only account is for monitoring only with no configuration authorization

Enable Read-Only Account	Enabled by Default
Read-only Username	Default is **guest**
Password	Default is **guest**

Remember to select Apply if any changes were made.

9.9.5 ADMIN Page CONFIG MANAGEMENT Section

This section allows the user to save the current configuration of the node in a file allowing backup of node configuration.

Backup Configuration	When the Backup button is presses, a prompt will pop up asking where to store the configuration file.
Backup System Log	When Backup is pressed, a page showing the contents of the current log files will be displayed. This then can be saved. One will have to hit the back button to get to the previous ADMIN page.
Upload Configuration	Hit browse to the location of a backup configuration file then hit restore. This will restore the unit configuration to the stored configuration.

9.9.6 ADMIN Page DEVICE REBOOT/RESET Section

Reboot Button	Will reboot the node
Reset to defaults	Will restore the node to factory defaults erasing all user set parameters.

10.0 Agency Compliance

FCC

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a Industrial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operations of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada

This Class A digital apparatus complies with Canadian ICES-003. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication. This device complies with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions:

- This device may not cause interference, and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe A est confrome à la norme NMB-003 Canada. Pour réduire le risque d'interférence aux autres utilisateurs, le type d'antenne et son gain doivent être choisies de façon que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas ce qui est nécessaire

pour une communication réussie. Cet appareil est conforme à la norme RSS Industrie Canada exempts de licence norme(s). Son fonctionnement est soumis aux deux conditions suivantes:

17 Compliance

- Cet appareil ne peut pas provoquer d'interférences et
- Cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

RF Exposure Warning

The antennas used for this transmitter must be installed to provide a separation distance of at least 2.52m from all persons and must not be located or operating in conjunction with any other antenna or transmitter.

Les antennes utilisées pour ce transmetteur doivent être installé en considérant une distance de séparation de toute personnes d'au moins 2.52m et ne doivent pas être localisé ou utilisé en conflit avec tout autre antenne ou transmetteur.

CE Marking

CE marking on this product represents the product is in compliance with all directives that are applicable to it.

This equipment may be operated in the following countries:

Great Britain and Northern Ireland, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Romania, Switzerland, Sweden

Installer Compliance Responsibility

Devices must be professionally installed and it is the professional installer's responsibility to make sure the device is operated within local country regulatory requirements.

RoHS/WEEE Compliance Statement

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.

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Contact information:

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Tel: 203-796-5300

Address: 3 Corporate Drive, Danbury, CT 06810 USA

We will reply within 7 working days once the request has been made through email or telephone.

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